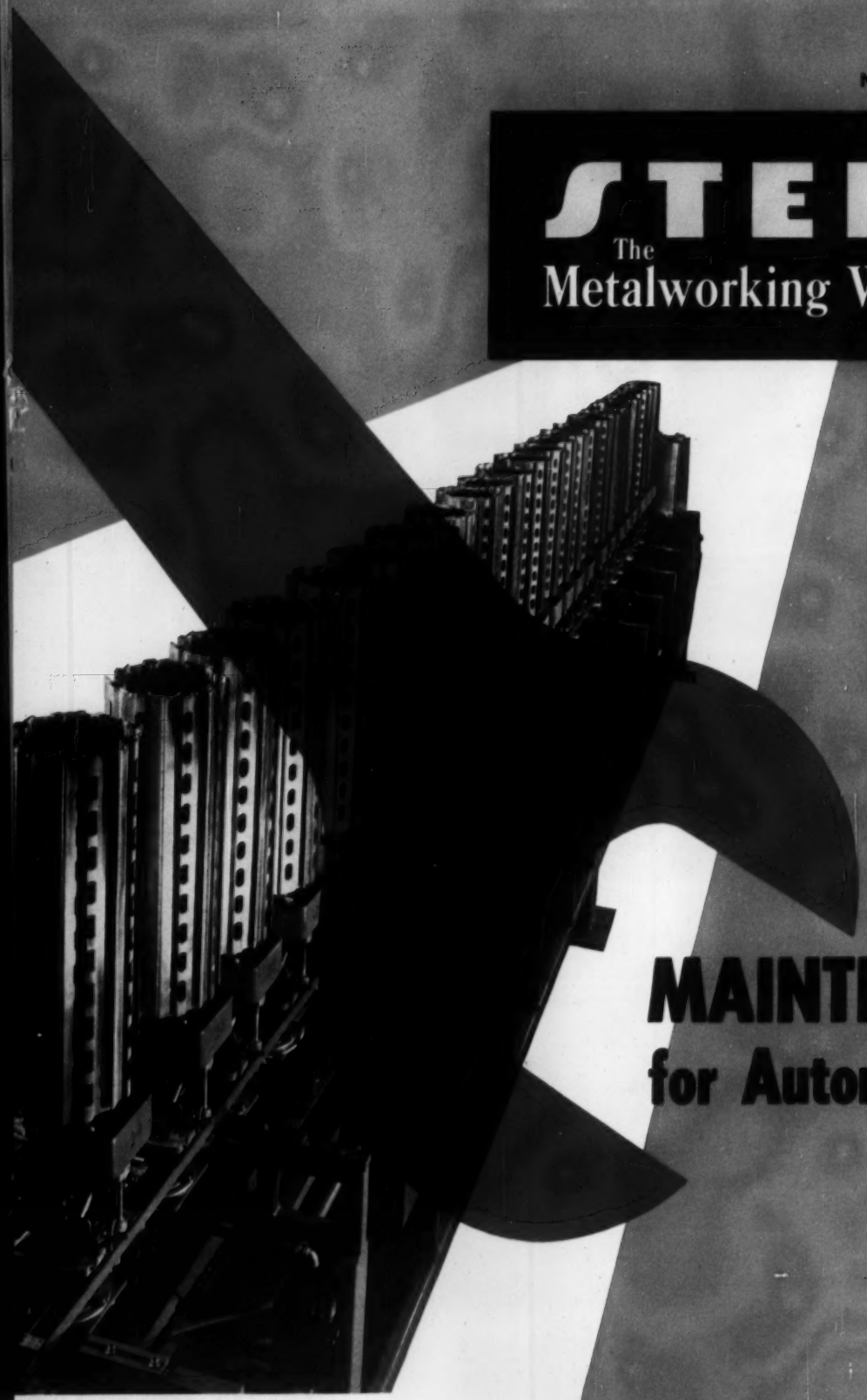
NOVEMBER 21, 1955

STEEL

The Metalworking Weekly



MAINTENANCE for Automation

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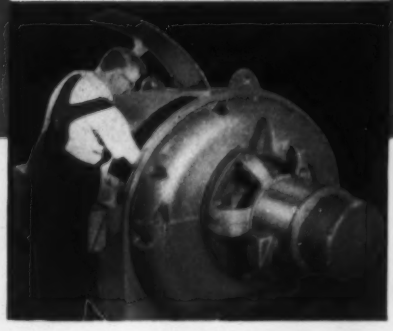
ALLIS-CHALMERS
Wound-Rotor and Synchronous
MOTORS

Shown is a 400-hp, 900-rpm end-shield bearing synchronous motor. Other Allis-Chalmers motors of this design are available from 250 hp at 300 rpm and up, in drip-proof and splash-proof construction.

Now full protection without loss of accessibility

All parts, including slip rings and leads, are enclosed — yet removable inspection covers and end-shield sections simplify maintenance.

Note accessibility offered by generous size opening covers. Upper half of end shield is removable for entrance to motor winding.



These motors combine modern functional design with maximum protection and accessibility.

Here are some of the important features:

- Collectors and brushes are protected by box-type stator yoke from physical damage, dripping moisture, dust and dirt.
- Cast end shields provide rigid bearing support and full protection for motor windings.
- Slip-ring leads are brought out to a terminal box — they are not left exposed.
- Capsule-type sleeve bearings permit inspection or cleaning of motor windings without exposing interior of bearing to dirt.
- Access covers are secured by easy-operating, self-locking fasteners for ready removal.

Get details — Call your nearby A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin. Ask for Bulletin 05R8183.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

A-4847

Fence made from bethanized wire stays strong and bright

Much of the chain-link fencing is made today from bethanized wire—and for good reasons. The uniform coating of 99-pct-pure zinc protects the wire against corrosion long after other types of fence have become unsightly or rusted away. Bethanized fence keeps its sparkle through years of service because of the tight bond of pure zinc on steel. Fence erectors like bethanized fence because the wires are not rough and won't slash fingers.

Pure zinc, tightly bonded to steel . . . that's bethanized wire

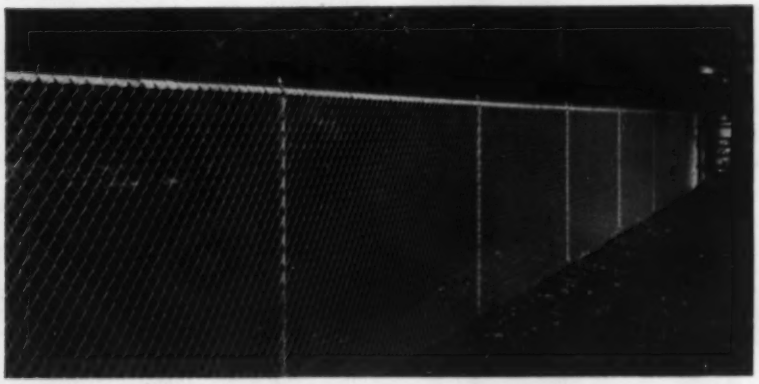
There are no thin spots in the bethanized zinc armor to give rust a foothold. The electrolytic process deposits a coating that is uniform over every inch of the wire.

Bethanized wire is ideal for twisted wire brushes, chain, conveyor belts and other products which require severe forming, swaging, cold-heading, and thread-rolling. You can bend it, twist it around its own diameter—even draw it through dies to fine gage. The pure zinc stays on.

Whether you need hard or soft-temper wire, light or heavy zinc coatings, we will be glad to ship you a trial order of bethanized. Just phone or write our nearest sales office for full details.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

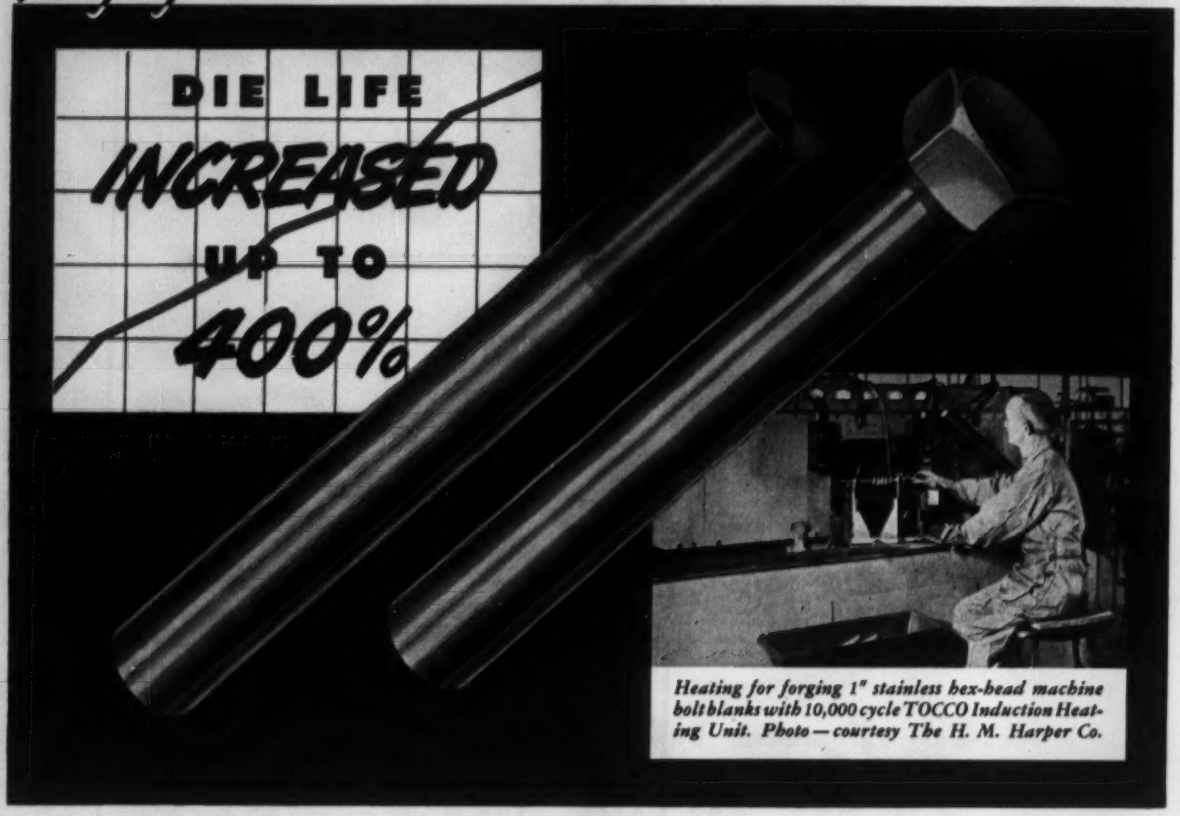


The bethanized coating of pure zinc adds extra years of service to chain-link fence. Photo courtesy: Atlas Fence Co., Philadelphia, Pa.

BETHLEHEM STEEL

BETHLEHEM STEEL

Forging: COPPER • BRONZE • ALUMINUM • MONEL AND STAINLESS STEEL



Heating for forging 1" stainless hex-head machine bolt blanks with 10,000 cycle TOCCO Induction Heating Unit. Photo — courtesy The H. M. Harper Co.

with TOCCO* Induction Heating

● Naval Bronze, Silicon Bronze, Copper, Aluminum, Monel and all types of stainless steel are heated for forging at the H. M. Harper Co., Morton Grove, Illinois. Regardless of material TOCCO can be profitably applied to brazing, heat-treating and forging operations in almost any metal-working plant.

PRODUCTION UP—In addition to the very important savings in forging dies, TOCCO has increased production to as much as 265% of output possible with former heating methods. On the 1" type 303 Stainless machine bolt blanks shown here TOCCO upped production from 75 to 200 parts per hour, using 35 K.W., 10,000 cycles.

VERSATILE—The same TOCCO machine is used on stock of ⅜" to 1¼" diameter; heated zones vary from ½" to 4". TOCCO'S automatic timing cycles provide complete uniformity of heating throughout both length and cross section—assuring a uniformly high quality product.

●

Why not have a TOCCO Engineer investigate your plant to determine where TOCCO can cut your costs and streamline your production?

THE OHIO CRANKSHAFT COMPANY

TOCCO

Mail Coupon Today

NEW **FREE** BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. S-11, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Heating for Forming and Forging".

Name _____
Position _____
Company _____
Address _____
City _____ Zone ____ State ____

Why, in one year, 73 companies paid 28% more for this Baker Gas Truck

The Baker Gas-O-Matic introduces a revolutionary new concept in automatic transmissions for gas-powered fork lift trucks. Instead of a torque converter, it employs a variable voltage generator—integral with the gasoline engine—and an electric motor.

The initial cost of this truck is about 28% higher than conventional clutch-type gas fork trucks. But . . . operating and maintenance costs are extremely low—in line with the higher priced battery-powered electrics. Moreover, frame, uprights, steering assembly, drive axle, etc.—in fact 90% of Gas-O-Matic's components—are standard Baker electric truck parts which always last 10 years or more.

Gas-O-Matic users have proven that

1. Fuel savings, originally estimated by our engineers as 40%, are actually in excess of 50% over ordinary gas trucks.
2. Depreciation costs are less because truck can be amortized over 9 years instead of 5.
3. Maintenance costs are less—no clutch or transmission to wear out and replace—30% fewer moving parts—no complicated electrical system—engine operates at controlled optimum RPM.

These Gas-O-Matic customers recognize the "lower-first-cost" fallacy—many of them have re-ordered for the second and third time—based on their experience with these trucks.

Write for complete information about this unusual fork lift truck.

Baker handling equipment

THE BAKER-RAULANG COMPANY

1259 WEST 80th STREET • CLEVELAND 2, OHIO

A subsidiary of Otis Elevator Company

5GE2

NEW ATOMIC CANNON

Added Evidence that—

Everyone Can Count on VEEDER-ROOT

This mobile 280 mm. atomic cannon has *two* recoil motions. The primary recoil absorbs the cannon's "kick". The secondary recoil (something new in artillery) absorbs the forces created by the primary recoil. And each recoil motion is recorded by this special Veeder-Root Counter designed with a plunger-action shaft . . . which keeps the score on the cannon's use and indicates approaching need for maintenance.

This again points up the fact that "Anything Worth Making — or Worth Doing — *Is Worth Counting.*" And Veeder-Root has the experience and resources *you* can count on, to give you any counter you need . . . for any mechanical or electrical application . . . in any field from Atomics to Automation. Write:

VEEDER-ROOT INCORPORATED
HARTFORD 2, CONNECTICUT

Chicago 6, Ill. • New York 19, N. Y. • Greenville, S. C.
Montreal 2, Canada • Dundee, Scotland
Offices and Agents in Principal Cities

"The Name that Counts"

STEEL
The Metalworking Weekly

NOVEMBER 21, 1955
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Recipes for RELIABILITY

There's no guesswork in the production of Seymour nickel silver, phosphor bronze and brass. Every step in their manufacture is prescribed—in detail—in a master quality control manual which is "the law" throughout Seymour casting shops and mills.

This is another reason why industry has come to rely on Seymour to deliver nonferrous metals which are uniform in quality, year in and year out.

"Specify Seymour!
You know it's good!"

NICKEL SILVER
PHOSPHOR BRONZE
BRASS

THE SEYMOUR MFG. CO.
SEYMOUR, CONN., U. S. A.

tough sprayed metal

well-known maintenance method now profitable production process

equipment fabricators find tough, high-quality sprayed metals build big bonus pay-offs

Modern metallizing—metal spraying—which for many years has saved millions of maintenance dollars by restoring worn machine parts for thousands of companies, is now helping many others improve their products, cut production costs.

In the production of new equipment, tough sprayed metal coatings provide highly desirable mechanical or electrical characteristics at low cost, in high speed, semi-automatic production.

General Electric, for example, a long-time user of metallizing to provide superior wearing qualities on critical areas of large turbine shafting, now applies sprayed metals to a wide range of its products. Many forward-looking companies have instituted investigative programs in their research and design labs to explore the use of metallizing as a means of giving their products competitive advantages in quality, or performance or price—or all three.

Metallizing may be able to help your company improve its products, economically, reduce machine maintenance costs, cut your bills for corrosion protection. It may pay you well to look into it. In any event you will find it a fascinating subject. Bulletin 51 illustrates and describes "Metallizing—its practical applications"—shows actual work being done in users' shops. We shall be happy to send you a copy.

METCO

Metallizing Engineering Co., Inc.

1167 Prospect Ave., Westbury, L. I., New York
Telephone: EDGEWOOD 4-1300 • Cable: METCO
In Great Britain: METALLIZING EQUIPMENT COMPANY, LTD. – Chobham near Woking, England

behind the scenes

Partly Read—by Parts?

As you know, STEEL is three magazines in one: It reports metalworking news, production-engineering and markets. Sometimes the reader who is vitally concerned about prices is only vaguely interested in the intricacies of production, whereas the reader who pores over modern heat treating, for example, might exhibit no concern at all over the cost of heavy melting scrap in Chicago.

About 138,000 persons read STEEL. It figures out to four-point-something readers per copy, but we don't usually stress that fact, because it would be an admission that every fifth reader is only a fraction of himself.

The metalworking management people who read STEEL have a remarkably wide range of interests, and we'll confess right now that the editorial staff works up a considerable sweat every week trotting out articles and items to spread before its sharp and perceptive audience. Consider, for instance, the Technical Outlook section: If the editors in charge of that department confuse one alloy with another, or ascribe a wrong date to a process, or transpose two steps in any given process, brother, they are dead ducks.

The cover story this week was cooked up and conducted by Machine Tool Editor Bob Huber. The photograph on the cover is of a machine that can automatically assemble any unit calling for standard electronic components—and how would you like to have one of *those* for your very own? It's just a little old autofab, and it was photographed right in the act of producing printed circuit assemblies for use in air defense computers.

Artist Craves License

Speaking of the technical section reminds us—now, there's a sneaky way of introducing another thought. We were going to talk about artist Tom Welsh, who lays out and illustrates the technical section, and the fact that we were speaking about the technical section had nothing to do with bringing up Tom. It's the employment of such dull cliches that kills communications, oral or written.

Well, Tom was handed a story on "What Caused the Forging To Fail?" (page 96), and he grew quite excited. The article revealed that on Dec. 19, 1954, a large forged turbine shaft in a Chicago power plant failed, killing two and injuring five. The cause of the failure has been of great concern to producers and users of large forgings. Last week Allis Chalmers released details of its extensive investigations.

"Here," said Tom, "we had a forged shaft flying to pieces with metallurgical sleuths hot on the trail for 12 months, and how do I have to treat the story? I got to lay it out around the metallurgy of a large forging, and the story is a straight piece about production and inspection!"

Casual thought: Wonder what would happen if the artists took complete charge of the magazine?

Stainless Award

In an attempt to bring more information about stainless steel to industry, Allmetal Screw Products Co. Inc., Garden City, N. Y., announced its sponsorship of an annual award to be given to the author of the article of most value and interest to those who specify or buy stainless steel parts or components. First prize is a cool $1000. Moreover, an Allmetal Stainless Steel Award Plaque will be awarded to the editor of the industrial magazine carrying the winning article. Three honorable mention scroll citations providing recognition to selected entries also will be awarded. Winners of the first annual award will be announced by Allmetal on Feb. 15, 1956. You can get additional information about the award by writing to: Secretary, Allmetal Award Committee, Allmetal Screw Products Co. Inc., Garden City, N. Y.

Shrdlu

(Metalworking Outlook—Page 41)

ANOTHER GREAT SAGINAW SUCCESS—

WORLD'S FIRST BALL BEARING SPLINE!

New Saginaw b/b Spline makes all ordinary splines obsolete!

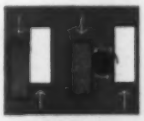
By applying the well-proved principle of the recirculating rolling ball (already made famous by the *Saginaw b/b Screw*), Saginaw has *revolutionized spline design!* The new *Saginaw b/b Spline* is so far superior to any spline ever before built that engineers are eagerly adopting it.

In any application where column length must change under torque load, the *Saginaw b/b Spline* offers unprecedented freedom from spline restrictions.

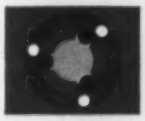
AVAILABLE IN ALMOST ANY SIZE, BEGINNING AT 3/8-IN. DIAMETER

Every *Saginaw b/b Spline* is individually engineered for its particular application, with the wealth of know-how that only Saginaw, the pioneer, can offer. Our engineers are ready and eager to help you.

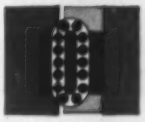
WHAT IT IS AND HOW IT WORKS:



Let's start with the familiar principle that there's far less friction in *rolling* than in *sliding*. The average coefficient of friction of the sliding spline is .2—while that of the ball/bearing spline is only .005.



By applying this principle, *Saginaw b/b Spline* radically increases the efficiency of transmitting or restraining high torque loads. Instead of *sliding* against each other, the mating surfaces *glide* on rolling balls.



The steel balls recirculate in closed circuits formed by mating longitudinal raceways spaced around the circumfecence of both the inner and outer splines. Ball guides return the balls to their starting point.

SAGINAW STEERING GEAR DIVISION OF GENERAL MOTORS • Saginaw, Michigan

Averages 40 Times Lower Coefficient of Friction Than Sliding Splines!

Imagine what this tremendous advantage can mean in your products or processes!

The *Saginaw b/b Spline* can be fitted with integral gears, clutch dogs, bearing and sprocket seats or other attachments for use with electrical, hydraulic or pneumatic units—forming a unit with unprecedented possibilities for the imaginative design engineer. It can enable you to:

ACHIEVE THE "IMPOSSIBLE"— By reducing weight and space requirements, *Saginaw b/b Spline* permits engineering designs hitherto impractical.

INCREASE DEPENDABILITY— Greatly decreased friction means less wear—longer life—safer, more dependable operation is assured.

MAIL COUPON FOR DATA BOOK TODAY!

A brand new 1956 Data Book—32 pages filled with information on *Saginaw b/b Splines & Screws.*

Saginaw Steering Gear Div.
General Motors Corp. (Dept. 15N)
Saginaw, Michigan

Please send 1956 *b/b Screw & Spline* Data Book to:

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

Saginaw ball bearing Spline

Steel edges...so smooth even germs find no hiding place

● A surgeon's scalpel blade is difficult to produce and the big problem is where you'd least expect—forming the back of the blade. Unless the edge of the strip steel is perfectly round and smooth the backing will not form properly, causing the scalpel to cut the surgeon's gloves, providing hiding places for bacteria and making sterilization most difficult.

Recognizing this problem, the Athenia Steel Division of National-Standard Company developed a special process to provide the special edge needed so a customer could successfully produce the proper shape. A small detail perhaps but it contributes to surgical success and has given this customer a competitive advantage on surgical blades.

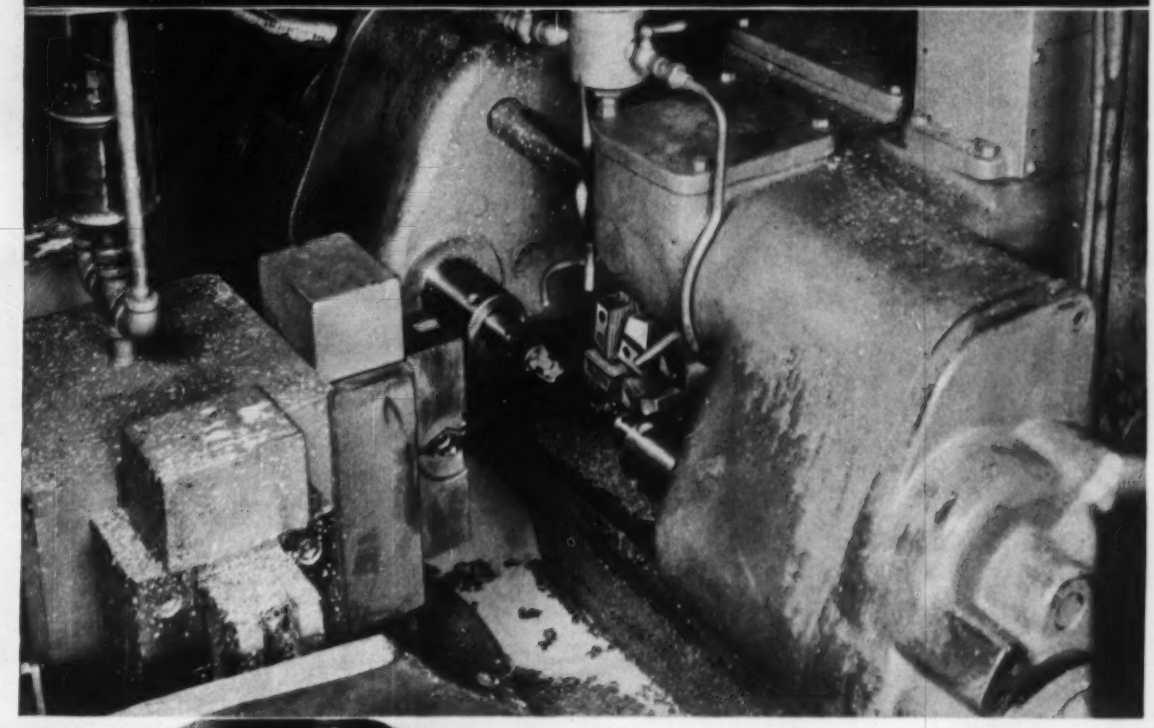
Athenia's production men specialize in development service such as this and in addition they produce standard spring steels and specialty items to the highest known standards of quality and uniformity.

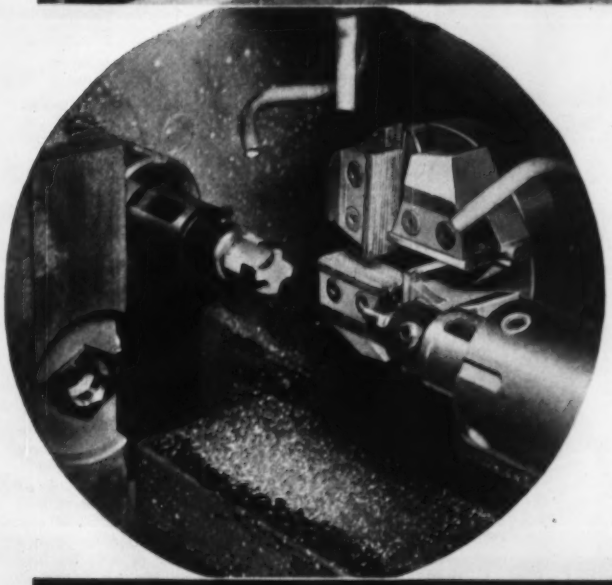
Why not try Athenia and see what can be done for you.

NS NATIONAL-STANDARD Company NILES, MICHIGAN

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape
ATHENIA STEEL DIVISION • CLIFTON, N. J.
Flat, High Carbon, Cold Rolled Spring Steel
REYNOLDS WIRE DIVISION • DIXON, ILLINOIS
Industrial Wire Cloth
WAGNER LITHO MACHINERY DIVISION • JERSEY CITY, N. J.
Special Machinery for Metal Decorating
WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes

57% Less Threading Cost
ON AUTOMATIC CHUCKING MACHINE





A *LANDIS* Solid Adjustable Die Head cut the cost of one threading operation in the plant of a large Middle Western manufacturer by 57%.

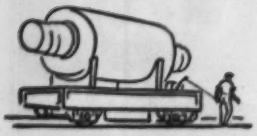
The operation, performed on a Goss and DeLeeuw Automatic Chucking Machine, required the cutting of a 1 11/16" diameter 14 pitch thread ½" long on cast brass valve bodies. Prescribed tolerances were easily maintained.

The *LANDIS* Head fit perfectly into the highspeed cycle of the chucking machine, and produced an average of 210 finished pieces per hour, revolving at 385 RPM. Major factors in the efficiency of this *LANDIS* Head were low down-time and low tool cost, occasioned by long tool life. Output of finished pieces averaged from 4,000 to 5,000 between chaser grindings.

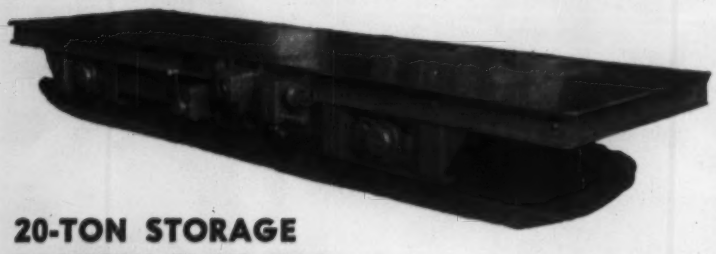
Please send job and machine specifications with your request for additional information.

LANDIS *Machine* COMPANY WAYNESBORO PENNSYLVANIA

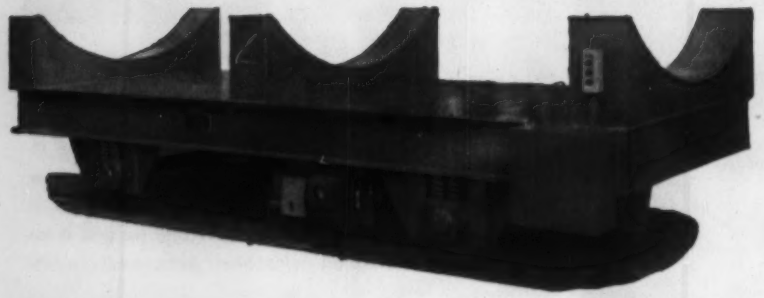
ATLAS SAFETY TYPE "SHORT HAUL" TRANSFERS



Atlas Safety-Type Transfers provide safe, low-cost service. Available with gas or diesel-electric, cable reel, or storage battery power. Atlas Transfers handle any type of load . . . and the heavier the load, the greater the savings.



20-TON STORAGE BATTERY FLAT CAR



20-TON STORAGE-BATTERY WITH CRADLE FOR PIPE

Request "Walk-Along" Bulletin 1283

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

LETTERS
TO THE EDITORS

Two Firms: Same Name

We noticed an announcement, "Empire Steel Opens Plant" (Nov. 7, page 126), about the opening of a steel warehouse and fabricating plant in Denver under the name of Empire Steel Corp.

To eliminate confusion in the trade, we request you announce that this new corporation (although of the same corporate name) is in no way connected with Empire Steel Corp., Mansfield, O., a producer of various steel products.

D. D. Hattman
Vice President-Secretary
Empire Steel Corp.
Mansfield, O.

Metal Finish Standards Needed

I would like a list or table of the standards which apply to surface finishes of sheets, formed or rolled materials and extrusions of steel, aluminum, stainless etc., after their rolling, polishing or extruding. This would not include an acid, plated or generally coated finish.

Where can I get this data?

Henry A. Nau
75 West St.
New York

• *Write John W. Sawyer, Code 550, Bureau of Ships, Navy Dept., Washington 25, D. C.*

Sales To Continue Strong

We are setting up our sales objectives for next year and are anxious to pass on to our sales organization a general opinion as to what the national trend will be in new steel orders for 1956.

Last year, you gave us your ideas for 1955, and we look forward with interest to your ideas and opinions about 1956.

C. T. Appleton
Vice President
Reed Rolled Thread Die Co.
Worcester, Mass.

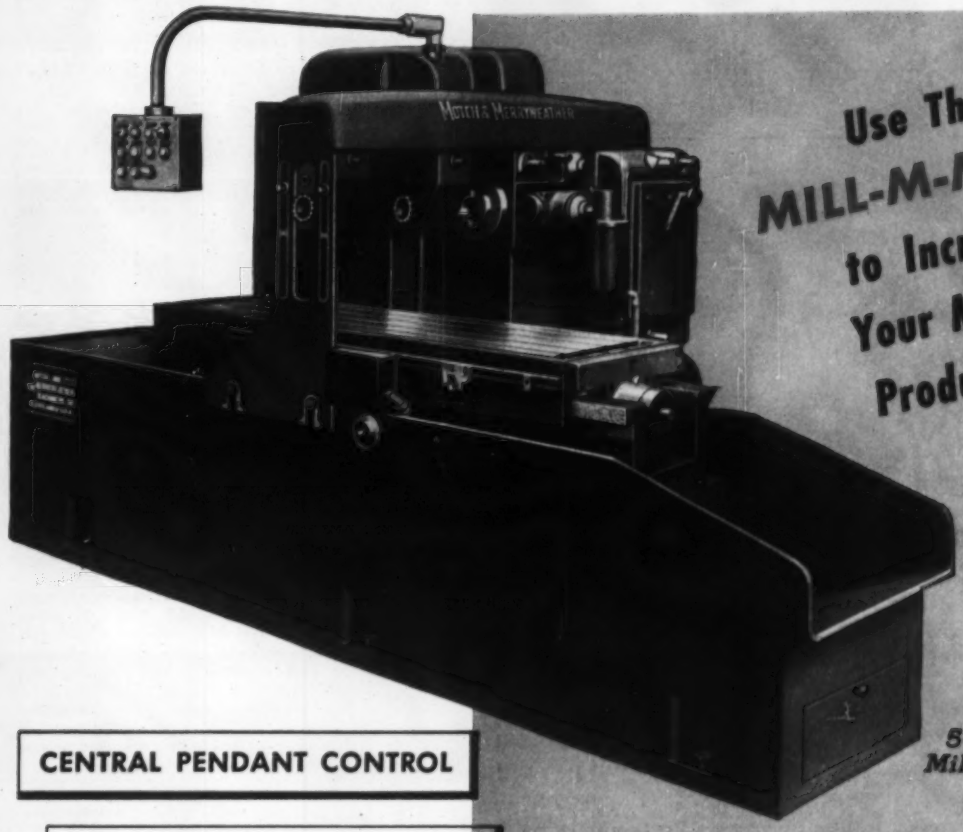
• *Ordering for delivery in the first quarter of 1956 is as strong as it has been in 1955.*

Steel demand will continue strong in the first half; some people think it will continue strong in the last half. A decline in demand for automobiles would affect steel demand, but it will be late in January before this can be detected.

Since 1956 is an election year, the "ins" will do everything possible to keep business at a high level. If business slows down, credit restrictions

(Please turn to page 12)

Justly Named—the Motch & Merryweather MILL-M-MATIC BED TYPE *Production* MILL



Use This MILL-M-MATIC to Increase Your Milling Production!

Model S-M-1842 Mill-M-Matic

CENTRAL PENDANT CONTROL

25 H. P. SPINDLE DRIVE

MECHANICAL TABLE FEED

AUTOMATIC TABLE CYCLES

RIGID OVER-ARM

You owe it to your production program to get all the details on this new *heavy duty* series of bed-type Mill-M-Matics. They utilize 25 horsepower through the spindle drive. Electrically controlled movements are mechanical to insure maximum rigidity and effective production with accuracy. . . The new Mill-M-Matic is now offered in a full range of heavy duty sizes by Motch & Merryweather, foremost builder of *traveling head* milling machines.

Copyrighted 1955 by The Motch & Merryweather Machinery Co.

THE MOTCH & MERRYWEATHER MACHINERY CO.

MACHINERY MANUFACTURING DIVISION

CLEVELAND 13, OHIO

Builders also of Circular Sawing Equipment, Vertical Turning, Automatic and Special Machines

The story of why industry succeeds in Mississippi is as simple as a nursery rhyme. But the pie in our story consists of raw materials, markets and labor. Manufacturers looking South will find a profitable plum here, overnight to hungry markets in the South, Southwest and Mississippi Valley. Mississippi's in the middle of the biggest industrial pie in history. Get the facts and cut yourself a slice.

MISSISSIPPI

AGRICULTURAL AND INDUSTRIAL BOARD

STATE OFFICE BUILDING • JACKSON, MISSISSIPPI

LETTERS

(Concluded from page 10)

would be loosened to allow business to pep up.

For more details, we suggest you see: "A Record 1956 Shapes Up" (Oct. 31, page 35) and "Steel Prices Must Rise" (Nov. 14, page 59).

Reader Likes 'Willie Waste'

We were introduced to "Willie Waste" in the article, "Saving Dollars in Manufacturing" (Oct. 24, page 104). He made such a good impression that we feel our employees should become acquainted. May we have two reprints?

D. J. McCullough
Assistant to Works Manager
ACF Industries Inc.
Berwick, Pa.

Spokesman Is Lauded

I read the Management at Work article, "S. D. Strauss: Editor Turned Salesman" (Sept. 26, page 79), with interest.

It is my opinion that the nonferrous metals industry would profit if more spokesmen like Mr. Strauss would follow the philosophy of communicating ideas and information to business and industry.

I think STEEL is to be congratulated for having selected him as an example of the type of business statesman whose activities should be encouraged.

Irving Smith Kogan
Public Relations Director
J. M. Hickerson Inc.
New York

Story Attracts Attention

Businessmen are giving the nod of approval to your article, "Market Facts: Where You Find Them and How To Use Them" (Oct. 24, page 91). They tell us your detailing of sources and the accompanying explanation is the best they've seen. We concur.

We have displayed the article prominently on a bulletin board in our front office with all the related literature tied to your story. It is attracting a great deal of attention.

The Director of Field Services would like 100 copies to distribute to field offices and we would like 100 copies for general distribution from our office.

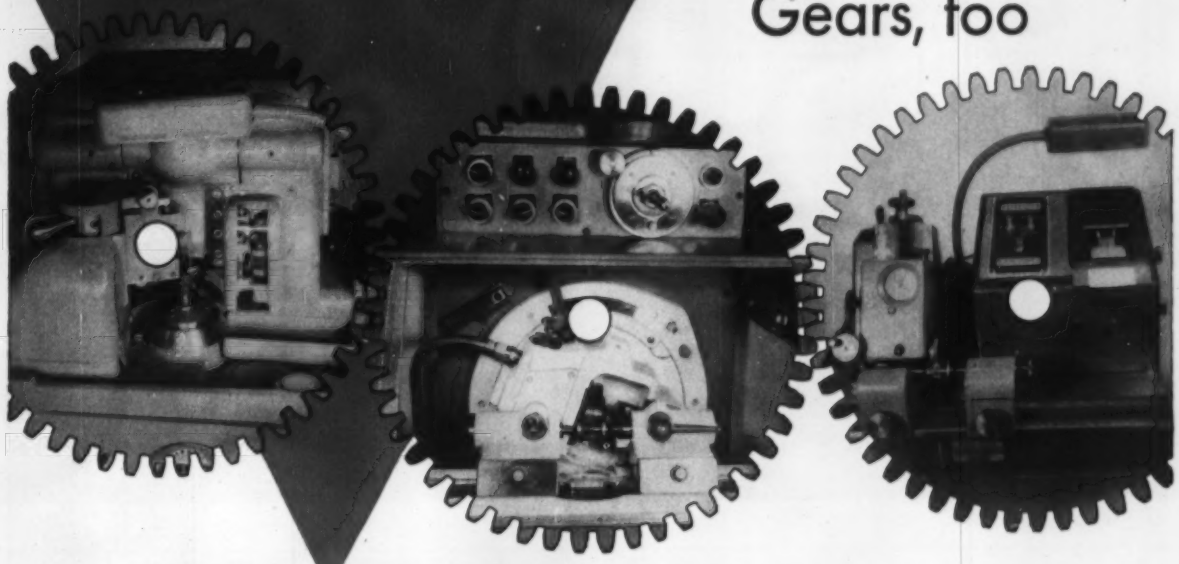
Zelda W. Milner
Commercial Agent
Field Office
U. S. Department of Commerce
Cleveland, O.

The map, "Metalworking Markets in the U. S.," offered in this article appears to reflect a wonderful over-all picture of the metalworking industry and would be a handy, as well as decorative, source of information.

I would appreciate your sending one of these maps to my attention.

E. H. Smalley
Manufacturing Manager
Kaiser Aircraft & Electronics Corp.
San Leandro, Calif.

FULLY INTEGRATED PRODUCTION ... for Fine-Pitch Gears, too



AT THE NMTB SHOW gear men had the opportunity to see for themselves how quantity production of high-precision fine-pitch gears can be achieved at low cost. Using a Fellows 3-Inch Gear Shaper, No. 4 Gear Shaving Machine, and No. 4 Red Liner Inspection Instrument... all fully integrated... production speeds can be obtained that a short time ago were considered impractical.

Simultaneously, close tolerances can be assured which will meet the most exacting gear-train requirements for electronics and instrumentation.

If you are interested in fine-pitch gears... either as a producer or user, or both... it will certainly pay you to get all the facts about the Fellows fully integrated line of equipment. WRITE, WIRE, or PHONE any Fellows Office.

THE FELLOWS GEAR SHAPER COMPANY,
78 River Street, Springfield, Vermont.
Branch Offices: 319 Fisher Building, Detroit 2
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2206 Empire State Building, New York 1
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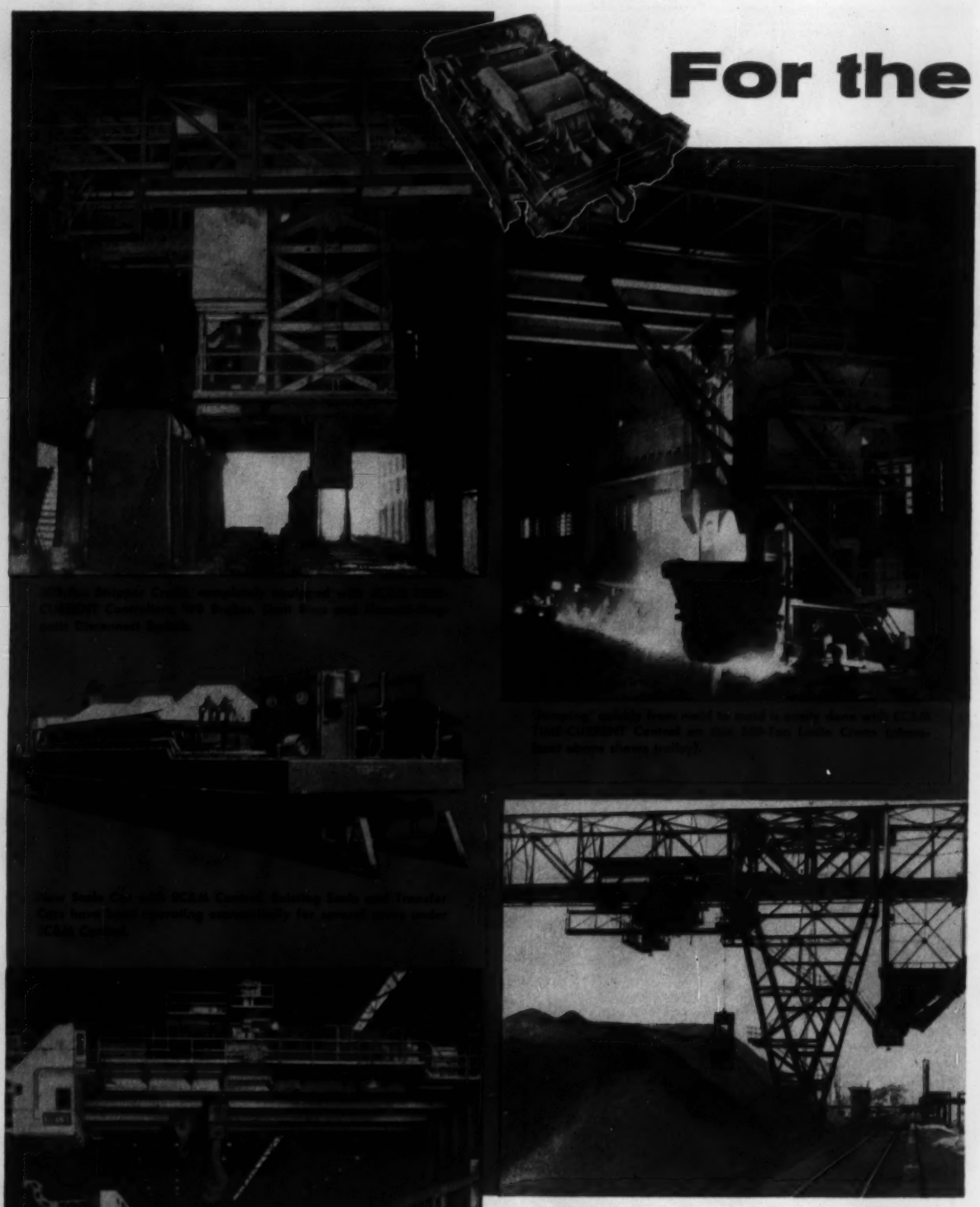
THE PRECISION LINE *Fellows* *Gear Production Equipment*

For the



12-Ton Charging Machine and 150-Ton Hot Metal Crane use EC&M Control for fast, accurate and dependable performance.

Coal Bridge Trolley is equipped with EC&M Factory-assembled TIME-CURRENT, LINE-ARC Contactor Controllers.

Installation Photos, courtesy of Youngstown Sheet & Tube Company

tough jobs in STEEL...

EC&M Control excels

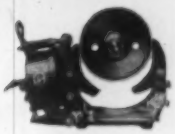
The BIG jobs in steel-making are tough . . . and vital. Safe operation is foremost, but equally important are dependability, economy and ability to give rapid response on short moves when needed. **EC&M TIME-CURRENT** Acceleration excels in taking the swing out of the ladle when jumping from mold to mold.

On major steel-producing operations, performance proves that **EC&M** Control is *accurately engineered* and gives the greatest service with lowest maintenance. Look at the proof of acceptance of **EC&M** Control for the tough jobs shown here.

You'll find, as others have, that **EC&M** Control is simplest . . . and has maximum safety advantages. Make your next job **EC&M** equipped by specifying "**EC&M** Control".

EC&M makes COMPLETE CONTROL
for Chargers • Cranes • Bridges • Cars • Mill Auxiliaries

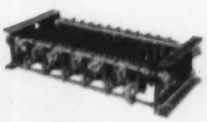
YOUNGSTOWN SAFETY LIMIT STOP
Bulletin 1032.



LONG-LIFE BRAKES for A-c and D-c Cranes.
Bulletin 1004.

MAGNETIC CONTROLLERS
Bulletin 921.

CAM MASTER SWITCHES
Bulletin 1190.



TAB-WELD Plate Resistors
Bulletin 942.

DISCONNECT SWITCHES
Bulletin 1023.

Bucket-Crane in Stockhouse is EC&M equipped.

One of two 8-Ton Ore Unloaders, EC&M Controlled.

THE ELECTRIC CONTROLLER & MFG. CO.
4498 Lee Road • Cleveland 28, Ohio

6844

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Production Pointers from GISHOLT

MASTERLINE GISHOLT SINCE 1887

TIME-SAVING IDEAS

Highlighting the great, new Gisholt MASTERLINE Machines—emphasizing new strides in efficiency and in lowering unit costs on a variety of jobs.

SPEEDS UP WORM SHAFT OUTPUT

New Gisholt No. 12 Automatic with JETracer turns trick

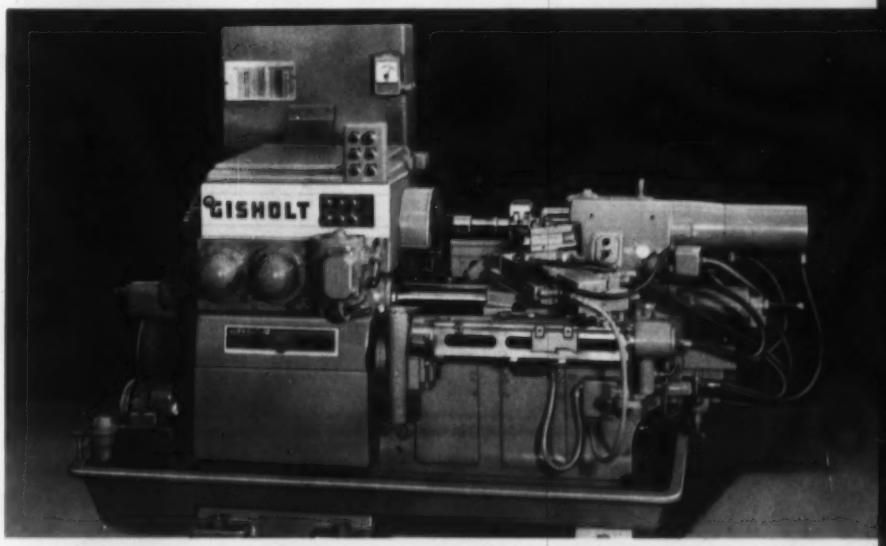
Here's how to boost production and cut costs on steel traverse worm shafts, using the new Gisholt MASTERLINE No. 12 Automatic Production Lathe.

Special equipment includes a Gisholt JETracer Slide mounted on the front carriage, plus a new triangular shaped tool post—hydraulically operated and automatically indexed—carrying a roughing and finishing tool. This arrangement permits maximum tool clearance with a minimum of overhang. Machining is fast, with a spindle speed of 900 RPM and a 40 HP motor providing power for the heavy roughing cuts.

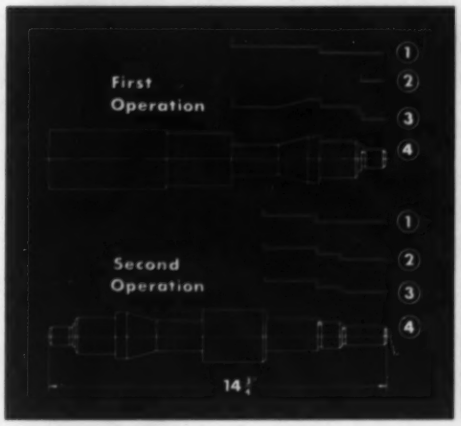
For the first operation, the rough bar stock is held between centers and driven by a work driver. As indicated in the drawing, one end of the part is rough and finish turned in four consecutive automatic passes. The tool post indexes automatically, presenting the finishing tool to the work for the final pass. At the same time, the grinding relief is formed from the rear independent slide. Floor-to-floor time: 3 minutes.

The second operation is equally easy and simple: the work driver jaws, templates and rear independent slide tools are changed—and the part is completed by four more automatic passes, with grinding reliefs formed from the rear independent slide during the finish turn. Floor-to-floor time: 2.80 minutes.

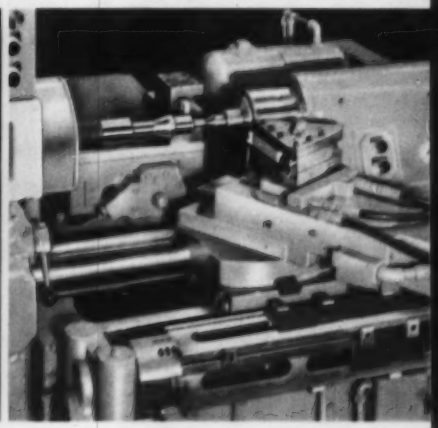
On this job, four consecutive automatic passes are made with four different templates to complete each operation.



New design refinements give Gisholt No. 12 MASTERLINE Automatic Production Lathe even greater capacity, versatility and ease of operation.



Special cam carrier indexes to present different template for each pass.



Closeup shows Gisholt JETracer Slide and automatic indexing tool post.

MASTERLINE GISHOLT SINCE 1887

TIME-SAVING IDEAS

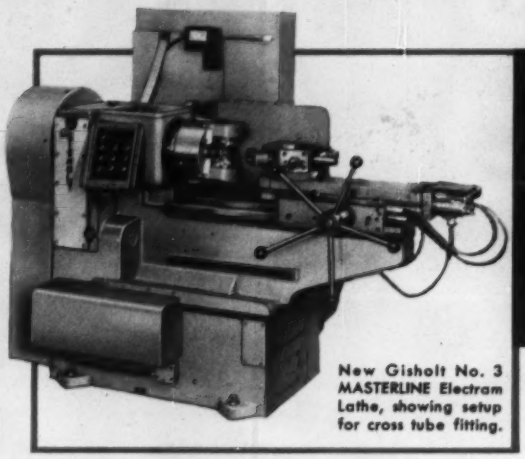
FOUR ENDS MACHINED IN SINGLE OPERATION

New Electram with pre-set controls boosts production

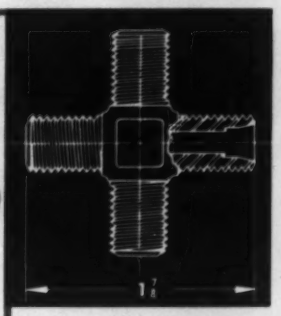
Here is a fast, positive, low-cost solution to handling parts requiring machining on two or more ends or sides—such as small to medium valves, tees, crosses, etc.

The machine is the new Gisholt MASTERLINE No. 3 Electram Lathe. The workpiece is a steel union cross tube fitting. All four ends are machined in a single chucking.

A Gisholt-Weatherhead Chuck is used to permit power indexing of the workpiece without stopping the spindle. Electrical controls at the rear of the turret ram are pre-set for each turret station and govern spindle speed, spindle reverse for tapping, spindle stop and single or double indexing of the hexagon turret.



New Gisholt No. 3 MASTERLINE Electram Lathe, showing setup for cross tube fitting.



Steel union cross tube fitting, showing surfaces machined on all four ends.

Hexagon turret tools face, chamfer, center, turn O.D., drill, form a 24-degree angle seat and a 15-degree angle bushing seat at all four ends. The workpiece is indexed in the chuck, so that tools on each hexagon turret station machine all four ends before indexing to the next turret station. To complete the part, all four ends are threaded, with the spindle reversing each time to withdraw the die head. Floor-to-floor time? Just 1.50 minutes.

Through this well-planned setup, multiple operations are handled on each of four ends of union cross tube fittings—with high volume output at lowest cost.

JETracer SAVES ON TIME, TOOLING COSTS, INSPECTION

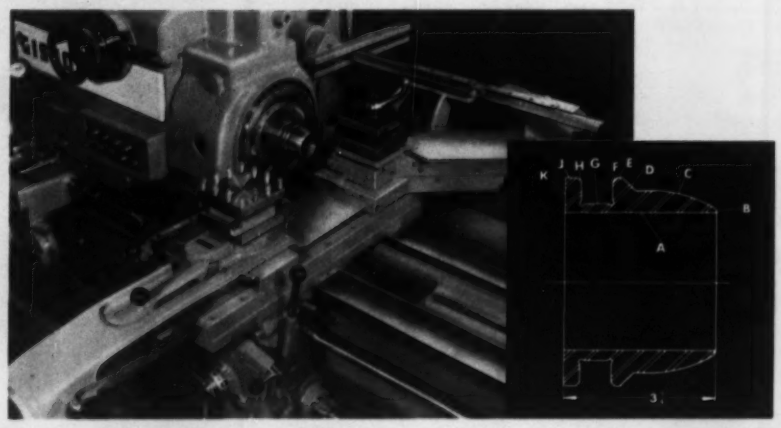
Simple application on Saddle Type Turret Lathe

The problem: how to machine steel bar feed wedges from 4½" diameter stock in one fast operation.

The solution: a new Gisholt MASTERLINE 2L Saddle Type Turret Lathe, equipped with a JETracer and a 40 HP motor.

To feed the 4½" diameter bar stock through the 4⅝" spindle bore, an outside operated collet chuck is used. The JETracer, mounted on the rear of a bridge-type cross slide, provides an economical means of accurately machining the contoured O.D. of the wedge. Considerable time is saved, tooling costs are reduced and inspection is greatly simplified.

Machining begins with the rough bar stock fed through the collet, against a hexagon turret stop. Other hexagon turret tools start drill, drill and rough and finish bore A. A single cutter turner reduces the stock O.D. in preparation for contour turning. Square turret tools rough and finish groove and chamfer F-G-H. The JETracer carries two tools (in an indexing-type square turret) which rough and finish generate B-C-D-E-J in two quick passes. The bar feed wedge is cut off at K from the front of the cross slide, and the job is finished. F.t.f. time is 8.50 minutes.



All surfaces handled in one fast operation. Close-up shows JETracer on rear of bridge-type cross slide.

Time is saved and inspection is simplified on this job through a most modern machine and smart tooling.

GISHOLT

TIME-SAVING IDEAS

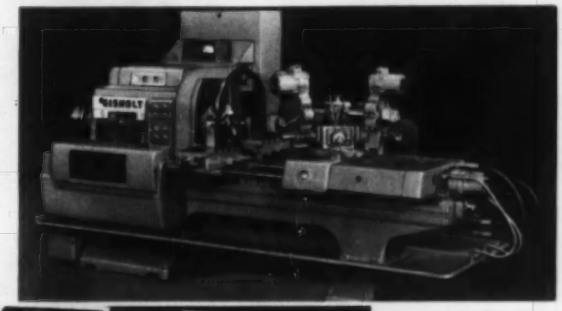
NEW FASTERMATIC CUTS SETUP TIME 50%

Simple toggle switches govern all machine functions

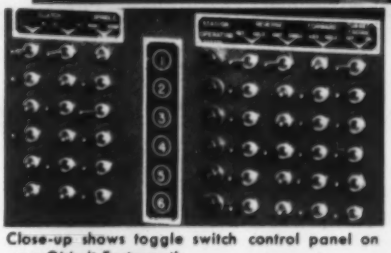
This new Gisholt MASTERLINE 2F Fastermatic Automatic Turret Lathe makes quick work of steel gear blank forgings. The secret is a new, electrically-controlled setup panel which simplifies and shortens set-up.

GEAR A—*Operation 1:* Hexagon turret fully tooled for both operations. Stations 3 and 6 bypassed. Stations 1, 2, 4 and 5 machine A-D-G-H. Cross slide tools machine B-C-E-F. F.t.f. time: 5.05 minutes. *Operation 2:* Change-over—one hour. Cross slide tools and chuck jaws changed, cross slides set to operate with stations 3 and 6. Stations 1, 2, 4 and 5 by-passed. Stations 3 and 6 machine M-J. Cross slide tools machine K-L-N-P. F.t.f. time: 1.50 minutes.

GEAR B—*Operation 1:* Change-over—1¾ hours. Adjust tools on stations 3, 4, 5 and 6 and change on stations 1 and 2 and on cross slides. Chuck jaws and spindle speeds changed and cross slides set to operate with stations 1 and 4. Stations 3 and 6 by-passed. Stations 1, 2, 4 and 5 machine A-F-G. Cross slide tools machine B-C-D-E. F.t.f. time: 5.75 minutes. *Operation 2:* Change-over—1 hour. Cross slide tools and chuck jaws changed, cross slides set to operate with stations 3 and 6. Stations 1, 2, 4 and 5 by-passed. Stations 3 and 6 machine M-H-J. Cross slide tools machine K-L-N-P. F.t.f. time: 1.39 minutes.



New Gisholt MASTERLINE Automatic Turret Lathe, designed to cut setup time 50%.



Close-up shows toggle switch control panel on new Gisholt Fastermatic.

Initial setup of the new Fastermatic is fast—simple toggle switches are set to govern all machine functions. On re-runs, a master reference card is used to further setup time.

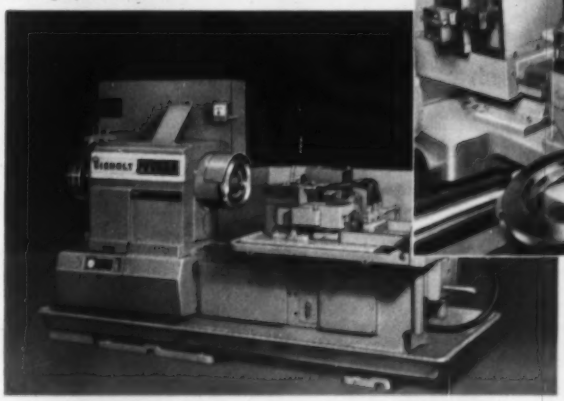
BEVEL GEAR FORGINGS IN 1.75 MINUTES F.T.F. TIME

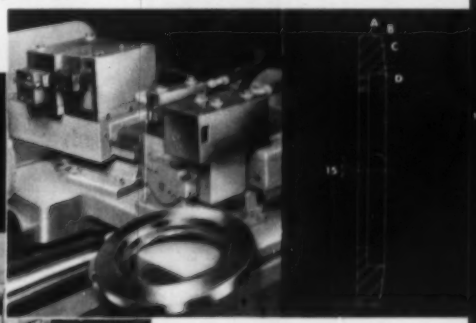
New MASTERLINE Simplimatic does low-cost job

Tough steel bevel gear forgings are a pushover on the new Gisholt Simplimatic Automatic Lathe.

Here's the operation: the part is centralized in the previously machined bore and chucked on the web in a draw-back clamp fixture. The platen table traverses forward, carrying slides and tools into position. The rear slide is set at the proper angle to machine the bevel face C. As the lead tool—held in a separate auxiliary slide—begins to feed, it is cammed to plunge into the face to roughing depth. Then, as slide movement continues, the lead tool feeds across with other rear slide tools following, to machine bevel face C and radius B. At the same time, front slide tools turn A and form radius D. F.t.f. time: 1.75 minutes.

New Gisholt MASTERLINE Simplimatic Automatic Lathe, designed for high-speed automatic machining operations.





Tooling setup for bevel gear job. Both slides have adjustable tops to speed tool setting. Rear slide has swivel base to simplify angular adjustment.

Fully automatic cycle of Simplimatic lets one man do two-man job; reduces f.t.f. time; cuts machining costs.

GISHOLT

MASTERLINE GISHOLT SINCE 1887

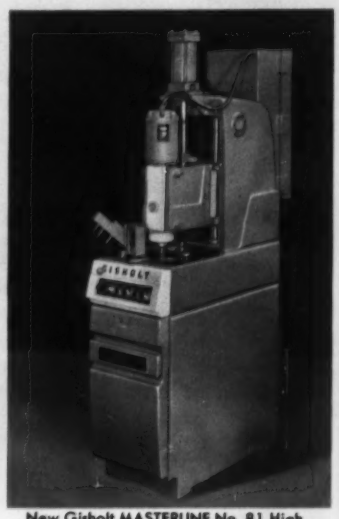
TIME-SAVING IDEAS

HIGH-SPEED OUTPUT ON VALVE TAPPETS WITH NEW GISHOLT SUPERFINISHER

Fully automatic handling speeds Superfinishing

Superfinished tappet with .005 inch crowned top.

Note cup-shaped stone over piece; pickup arms; ejector assembly and chamfer attachment.



New Gisholt MASTERLINE No. 81 High Production Superfinisher.

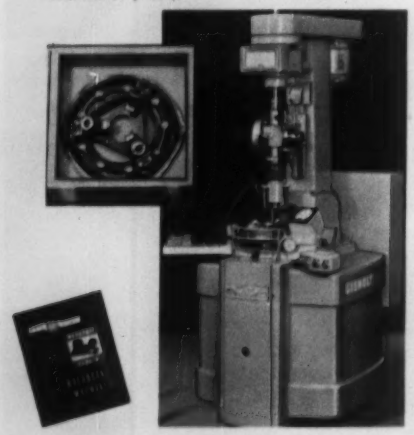
Here's how cast iron valve tappets are handled automatically on the new Gisholt MASTERLINE No. 81 High Production Superfinisher.

Cup-shaped stones are used, rotating off-center to generate a .005" crown on top of each tappet.

These parts are Superfinished from a flat ground surface down to 5 micro inches RMS or less. As each part is completed, a work transfer device with a left and right pickup arm is actuated. The left arm removes a rough part from a feeder conveyor, while the right arm receives the Superfinished part ejected from the spindle. Next, the transfer indexes so that the left arm is over the spindle and the right arm above a discharge conveyor. An ejector assembly pushes the rough workpiece into the spindle—the finished part onto the discharge conveyor. The transfer indexes to neutral, permitting the stone to engage the work. After Superfinishing, the stone retracts; a chamfering attachment operates, and the above cycle repeats. Floor-to-floor time is only 16 seconds per piece.

Superfinishing gives valve tappets longer life; automatic handling cuts costs.

Improved Gisholt Type 1SV1 DYNETRIC Balancing Machine setup for clutch and pressure plate assemblies (inset).



Write for free copy of Form 1165-A, the new Gisholt Type "S" Balancing Catalog.

No. 11-1255
643

LOCATES, MEASURES, CORRECTS, INSPECTS IN SINGLE HANDLING

Gisholt 1SV1 DYNETRIC Balancer handles 90 parts an hour

This is an interesting example of how the 1SV1 Balancer cuts costs, by minimizing the motions demanded of the operator.

Here, clutch and pressure plate assemblies are rotated as the operator observes angle and amount of unbalance in the same visual field. One unit on the amount meter represents 1/32" drill depth of a 9/16" diameter drill at the radius of correction. A simple scale on the drill press assures drilling to depth indicated on the meter. Angular location is read on a dial under a stroboscopic lamp.

To correct for unbalance, the operator stops the spindle, positions the part for correction at the observed angle, and lowers the drill. A chip removal tube comes down with the drill and removes chips as they are formed. A thrust device supports the work. After correction, the part is again rotated to assure balance within tolerance. The 90 parts an hour are handled at 80% efficiency.

Equipping a standard balancing machine with simple attachments assures maximum production with minimum effort.

THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

NEW!

..LaSalle introduces another quality product!

LARGE HEXAGONS

available NOW! . . in cold-drawn steel bars (GRADE C 1018) . . sizes to 4"

Yes, you can now buy cold-drawn hexagon steel bars in sizes up to and including 4". Effective immediately, LaSalle offers 3¼", 3½", 3¾" and 4" diameter hexagons . . in addition to conventional sizes ranging from ⅛" to 3".

No longer is it necessary to resort to costly and time-consuming forging, milling or other machining to produce large-size hexagons.

And with *cold-drawn* large hexagons you naturally get the superior mechanical qualities inherent in cold-drawn steel bars. Ask your steel distributor for Large Hexagons by LaSalle.

La Salle STEEL CO.

the Most Complete Line of Carbon and Alloy Cold-Finished and Ground and Polished Steel Bars in America.

For additional detailed information, send for your copy of this helpful new data sheet, "Large Hexagons."

LA SALLE STEEL COMPANY
1414 150th Street
Hammond, Indiana

Please send me Helpful Data Bulletin No. 14 "Large Hexagons"

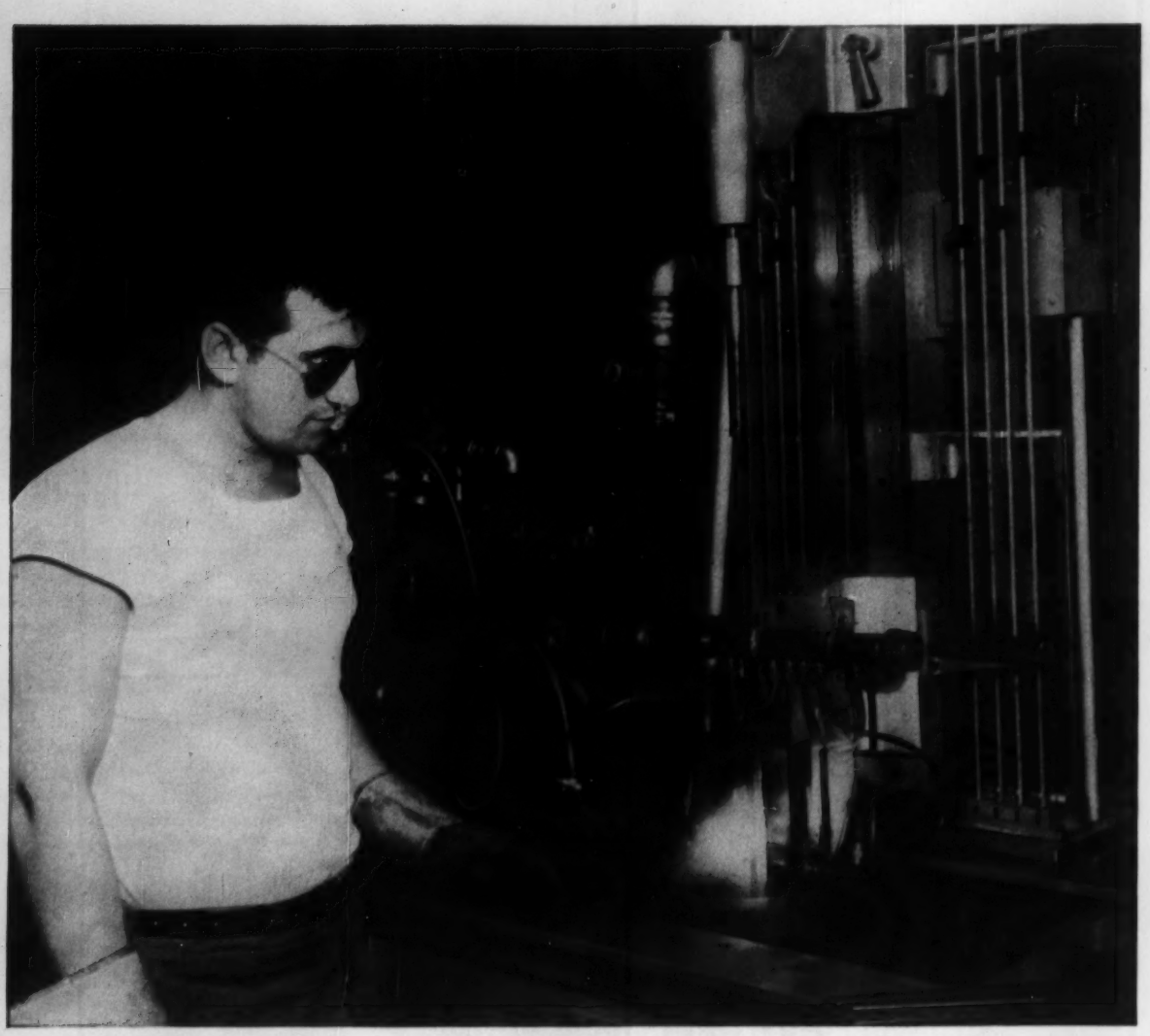
Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____



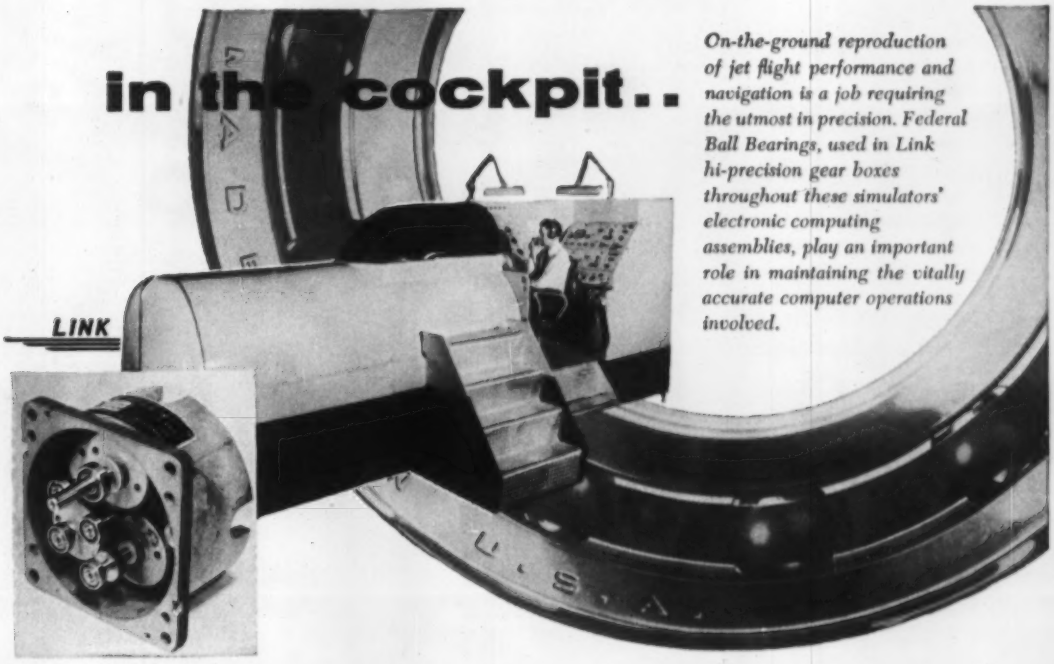
GAS— an adaptable tool for L R Heat Treating Co.

This is one of the many applications of Gas for special heat treating problems at L R Heat Treating Co., Newark, New Jersey. In this case, metal to be heat treated is held stationary while Gas burners move vertically along the length of the work. Sprays of water just below the flame area do the quenching.

Gas is the fuel used for heat treating at this modern plant. When asked to give their reasons for preferring Gas for heat treating, the staff at L R Heat Treating selected the following points as most important:

1. Very clean
2. Easy to control
3. Better combustion
4. Less equipment maintenance
5. No messy leaking connections
6. Easier to start up after shut-down
7. Dependable fuel supply
8. Excellent technical service supplied by the local utility

For further information on how Gas can help you in your heat treating operations, call your Gas Company Industrial Specialist. He'll be glad to discuss the economies and results Gas and modern Gas-fired industrial equipment can provide. *American Gas Association.*



On-the-ground reproduction of jet flight performance and navigation is a job requiring the utmost in precision. Federal Ball Bearings, used in Link hi-precision gear boxes throughout these simulators' electronic computing assemblies, play an important role in maintaining the vitally accurate computer operations involved.

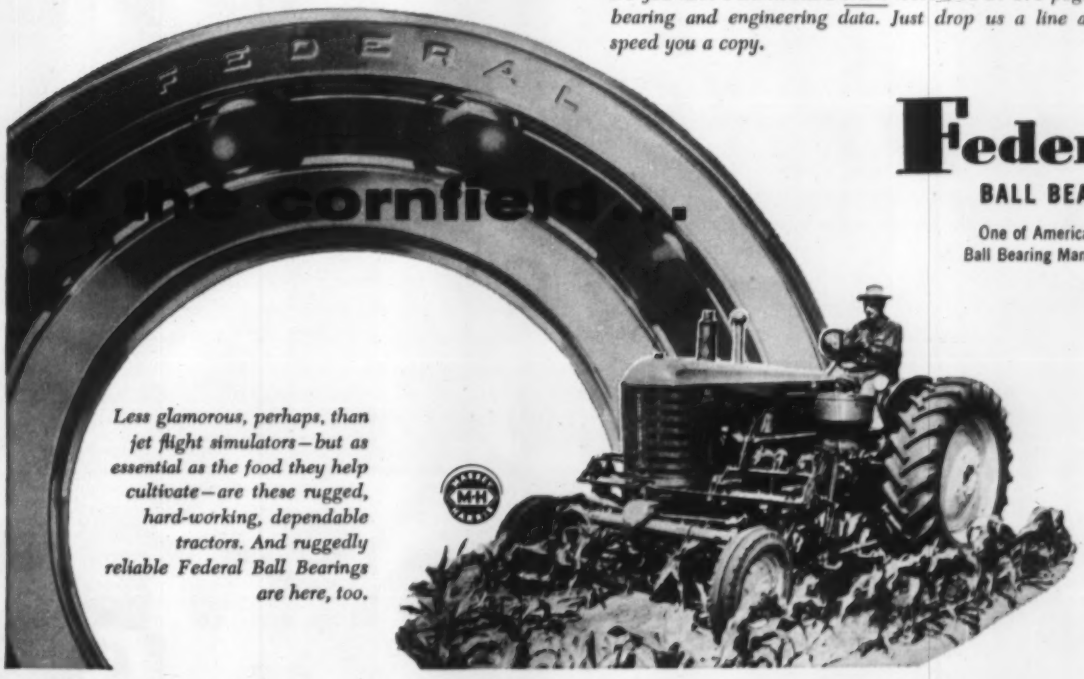
so much of industry *turns* on FEDERAL ball bearings

From trainers for pilots to tractors for ploughs—in home, office, machine shop—wherever you find mobility—you'll find Federal Ball Bearings helping to keep things moving. Hundreds of types—more than 12,000 sizes! And all produced by a company that has devoted 50 years to the manufacture of ball bearings . . . exclusively.

When Federal Ball Bearings are part of so many things you *use*, shouldn't they be part of the things you *make*?

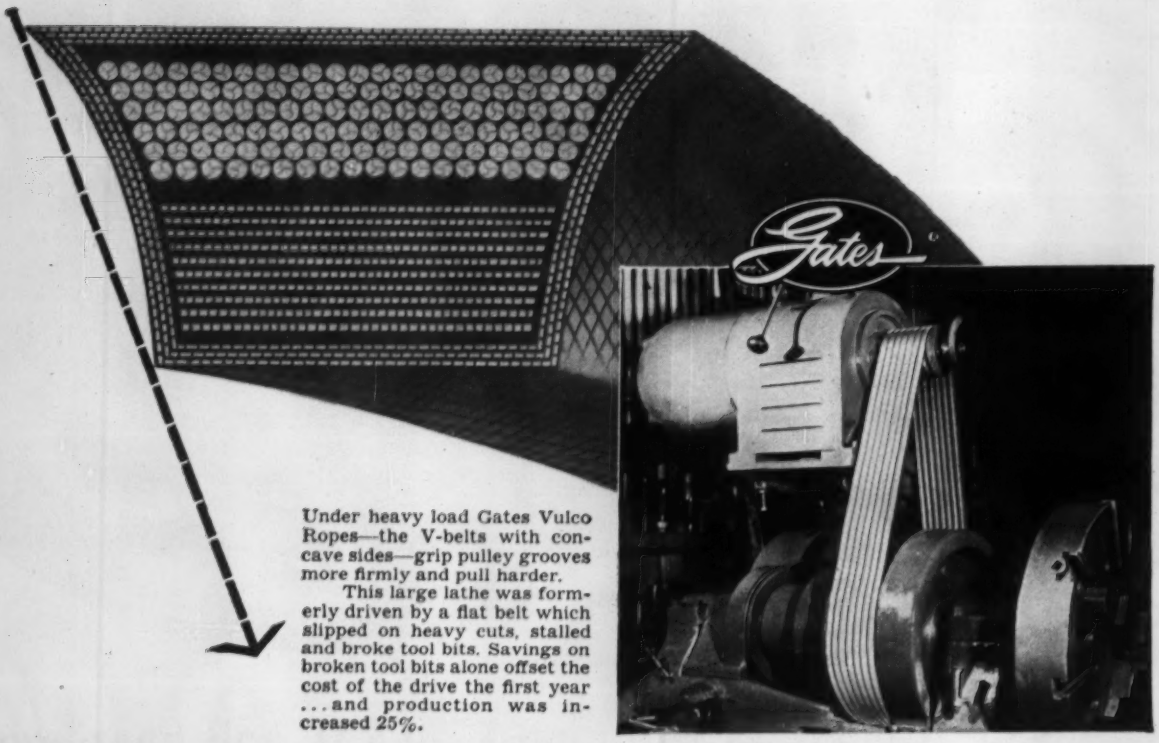
THE FEDERAL BEARINGS CO., INC. • POUGHKEEPSIE, N. Y.

Do you have FEDERAL'S NEW CATALOG? 175 pages of ball bearing and engineering data. Just drop us a line and we'll speed you a copy.



Less glamorous, perhaps, than jet flight simulators—but as essential as the food they help cultivate—are these rugged, hard-working, dependable tractors. And ruggedly reliable Federal Ball Bearings are here, too.

Federal
BALL BEARINGS
One of America's Largest Ball Bearing Manufacturers



Under heavy load Gates Vulco Ropes—the V-belts with concave sides—grip pulley grooves more firmly and pull harder.

This large lathe was formerly driven by a flat belt which slipped on heavy cuts, stalled and broke tool bits. Savings on broken tool bits alone offset the cost of the drive the first year ...and production was increased 25%.

Concave sides keep belt costs down!

Industry is saving thousands and thousands of dollars every year by specifying Gates Vulco Ropes—the V-Belts with *concave sides* (U.S. Pat. No. 1813698).

Here's the interesting reason *why* Gates belts save money:

On the bend around the sheave the *precisely engineered* concave sides (Fig. 1) of the Gates belt fill out and become straight (Fig. 1-A). Thus the belt makes uniform contact with the sides of the pulley. That means sure pulling power and *even distribution of wear.* Longer wear, fewer replacements cut belt costs...reduce down time...contribute to profits.

Simple test proves value of concave sides

Bend a straight-sided belt (Fig. 2) and feel the sides *bulge out* around the bend. The bulging sides prevent the belt from fitting evenly in the pulley groove (Fig. 2-A). Uneven contact causes uneven wear...shortens belt life...increases costs.

Keep belt costs *down* by specifying Gates Vulco Rope Drives—the V-Belt with *concave sides.* Belts you need are readily available from nearby distributor stocks. The Gates Rubber Company, Denver, Colorado—*World's Largest Maker of V-Belts.*

Gates Engineering Offices and Distributor Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 25-A

GATES VULCO ROPE DRIVES

AJAX

THE **AJAX** MANUFACTURING COMPANY

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110 S. DEARBORN ST., CHICAGO 3, ILL. • DEWART BLDG. NEW LONDON, CONN.

W. P. WOOLDRIDGE CO.

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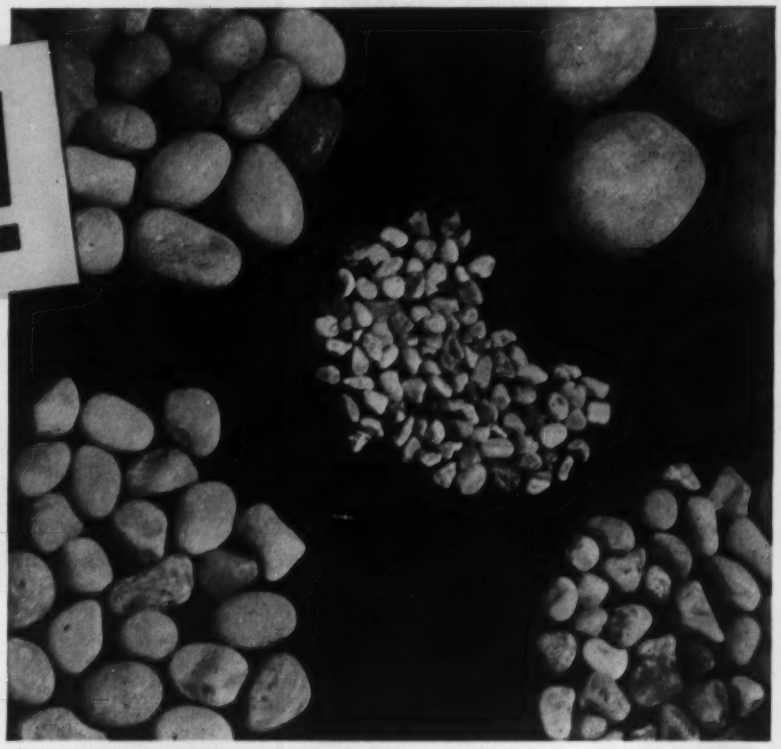
NEW!

TUMBLEX "N" Abrasive



PROCESSED BY NATURE and offered exclusively by Norton, the new Tumblex "N" Abrasive comes in sizes ranging from 3/16" by 3/8" to 1 5/8" by 2 1/2".

A natural for better barrel-finishing

Latest tumbling abrasive — natural flint stone — offers new "TOUCH of GOLD" benefits — brings finish up and costs down

Tumblex "N" Abrasive is Nature's own tumbling abrasive. Carefully selected and graded by Norton, it opens up new possibilities for barrel-finishing applications such as light deburring, breaking sharp edges, polishing and burnishing and other operations where little actual cut is required.

Tumblex "N" has proved particularly valuable in bringing out the most desirable color of the finished part. Metals on which it has proved its ability to give an excellent finish include zinc, brass, copper, aluminum and various forms of steel, including stainless.

Its rounded, uniform shape and very low breakdown ratio prevent wedging, permit longer cycles and reduce the need of rescreening.

Another big Tumblex "N" advantage is extremely uniform cutting action. This assures the same uniform finishing in load after load. Also, it enables close regulation of cut; for example, by adding measured quantities of loose abrasive grain to Tumblex "N" you can speed up the rate of cut with little effect on the life of this natural abrasive. Exact formulas for best results in job or production tumbling are easily worked out.

Norton customers who have tested Tumblex "N" Abrasive report:

- ***"Very good luster with no noticeable wear."***
- ***"Fine performance. Very little breakdown. Reordering 700 pounds of sizes 2½T and 3½T."***
- ***"Color O.K. on both zinc and brass."***
- ***"Very long life. Gave excellent color on stainless steel."***
- ***"A good polishing stone on aluminum."***

Send Your Work Samples

Let us demonstrate in our newly enlarged Sample Processing Department how Tumblex "N" Abrasive can give the value-adding "Touch of Gold" to your product quality and cut your barrel-finishing time and costs. NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone directory, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass. G-297

NORTON
ABRASIVES

Making better products... to make your products better

NORTON COMPANY
Abrasives • Grinding Wheels
Grinding Machines • Refractories
BEHR-MANNING DIVISION
Coated Abrasives • Sharpening Stones
Pressure-Sensitive Tapes

CALENDAR
OF MEETINGS

Nov. 27-30, American Institute of Chemical Engineers: Annual meeting, Hotel Statler, Detroit. Institute's address: 25 W. 45th St., New York 36, N. Y. Secretary: F. J. Van Antwerpen.

Nov. 27-Dec. 2, American Institute of Steel Construction Inc.: Annual meeting, Boca Raton hotel and club, Boca Raton, Fla. Institute's address: 101 Park Ave., New York 17, N. Y. Secretary: M. Harvey Smedley.

Nov. 28-Dec. 1, Air Conditioning & Refrigeration Exposition: Atlantic City Auditorium, Atlantic City., N. J. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Dec. 5-9, National Exposition of Chemical Industries: Commercial Museum and Convention Hall, Philadelphia. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y. Manager: E. K. Stevens.

Dec. 7-9, American Institute of Mining & Metallurgical Engineers: Electric furnace steel conference, William Penn hotel, Pittsburgh. Institute's address: 29 W. 39th St., New York, N. Y. Secretary: E. H. Robie.

Dec. 7-9, National Association of Manufacturers: Annual meeting and exhibit, Waldorf Astoria, New York. Association's address: 2 E. 48th St., New York, N. Y. Secretary: Noel Sargent.

Dec. 12-13, Material Handling Institute Inc.: Annual meeting, Hotel Statler, New York. Institute's address: One Gateway Center, Pittsburgh 22, Pa. Managing director: R. Kennedy Hanson.

Dec. 12-16, Atomic Exposition and Nuclear Engineering & Science Congress: Public Auditorium, Cleveland. Information: International Atomic Exposition, 931 Book Bldg., Detroit 26, Mich.

Dec. 13-15, Industrial Truck Association: Winter meeting, Hotel Statler, New York. Association's address: Washington Loan & Trust Bldg., Washington 4, D. C. Managing director: William Van C. Brandt.

Jan. 3-6, Institute of Scrap Iron & Steel Inc., Annual meeting and exhibit, Sherman hotel, Chicago. Institute's address: 1729 H St. N.W., Washington 6, D. C. Executive vice president: E. C. Barringer.

Jan. 9-13, Society of Automotive Engineers Inc.: Annual meeting, Sheraton-Cadillac hotel and Hotel Statler, Detroit. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Jan. 11-14, American Road Builders' Association: Annual convention and exhibit, Municipal Auditorium, Miami Beach, Fla. Association's address: World Center Bldg., Washington 6, D. C. Executive vice president and secretary: Eugene Reybold.

Jan. 23-25, Truck-Trailer Manufacturers Asciation Inc.: Annual meeting, Edgewater Gulf hotel, Edgwater Park, Miss. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

Jan. 23-26, Plant Maintenance & Engineering Show: Convention Hall, Philadelphia. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Jan. 24-27, American Management Association: General management conference, Fairmont hotel, San Francisco. Association's address: 330 W. 42nd St., New York 36, N. Y. Vice president-secretary: James O. Rice.

Jan. 26-27, Blast Furnace & Coke Association of the Chicago District: Winter meeting, Del Prado hotel, Chicago. Information: C. W. Bruce, chief engineer, Republic Steel Corp., 11600 S. Burley Ave., Chicago 17, Ill.

Jan. 29-Feb. 2, Associated Equipment Distributors: Annual meeting and exhibit, Conrad Hilton hotel, Chicago. Association's address: 30 E. Cedar St., Chicago, Ill. Executive secretary: P. D. Hermann.

Feb. 1-2, Midwest Welding Conference: Armour Research Foundation, Illinois Institute of Technology, Chicago. Information: Harry Schwartzbart, Armour Research Foundation, 35 W. 33rd St., Chicago 16, Ill.

...the perfect way NOT to buy fasteners!

When you purchase FASTENERS, your first considerations should be given to quality, delivery and prices. Chandler, as a leading manufacturer of cold forged cap screws, takes the same considerations. Mass production is only part of their story . . . but absolute control during every phase of production means top quality and uniformity.

Realistic pricing is important . . . and is followed.

If your requirements include automotive, Place self-locking, connecting rod or aircraft engine bolts in high carbon alloy and stainless steels, check with Chandler today. They are prepared to produce special heads, drilled heads and shanks, and ground bolts to tolerances as close as 0.0005-inch.

Write today for literature.

Specialists in Thread-Rolling after Heat Treating.

CHANDLER PRODUCTS CORPORATION

1488 Chardon Road • Cleveland 17, Ohio

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and here is the way!

To Reduce Manufacturing Costs with a . . .

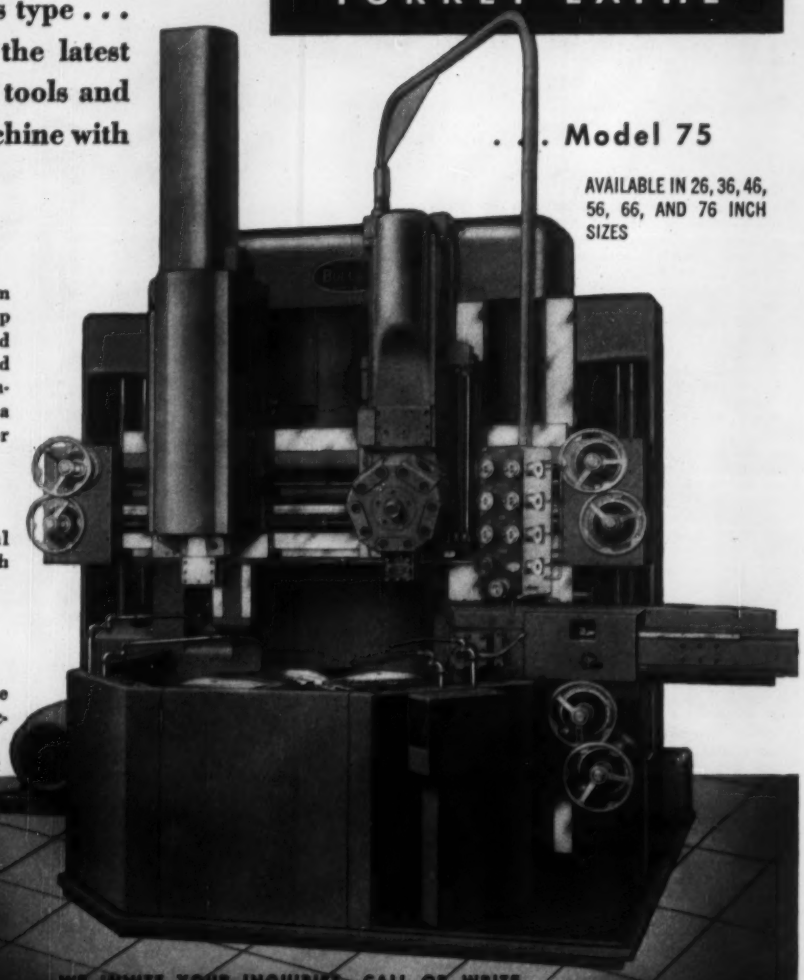
SEVENTY FIFTH BULLARD ANNIVERSARY

CUT MASTER
VERTICAL TURRET LATHE

This revolutionary new design of vertical turret lathe has exclusive features never before offered on machines of this type . . . takes full advantage of the latest improvements in cutting tools and methods . . . truly the machine with a "built-in" future.

. . . Model 75

AVAILABLE IN 26, 36, 46, 56, 66, AND 76 INCH SIZES



PENDANT CONTROL . . .
provides maximum machine control from a movable pendant station. Start and stop spindle; selection of speeds, feeds and directional movement of all heads in feed or traverse are quickly and easily accomplished from the Pendant. Interlocks and a stopall stick provide safety for both operator and machine.

SCREW FEED . . .
is provided for vertical and horizontal motion of all heads—to assure fine, smooth finishes with greater accuracy.

POWER INDEXED MAIN TURRET . . .
(Optional) Five sided turret for "run of the mill" jobs. Four sided turret for production jobs.

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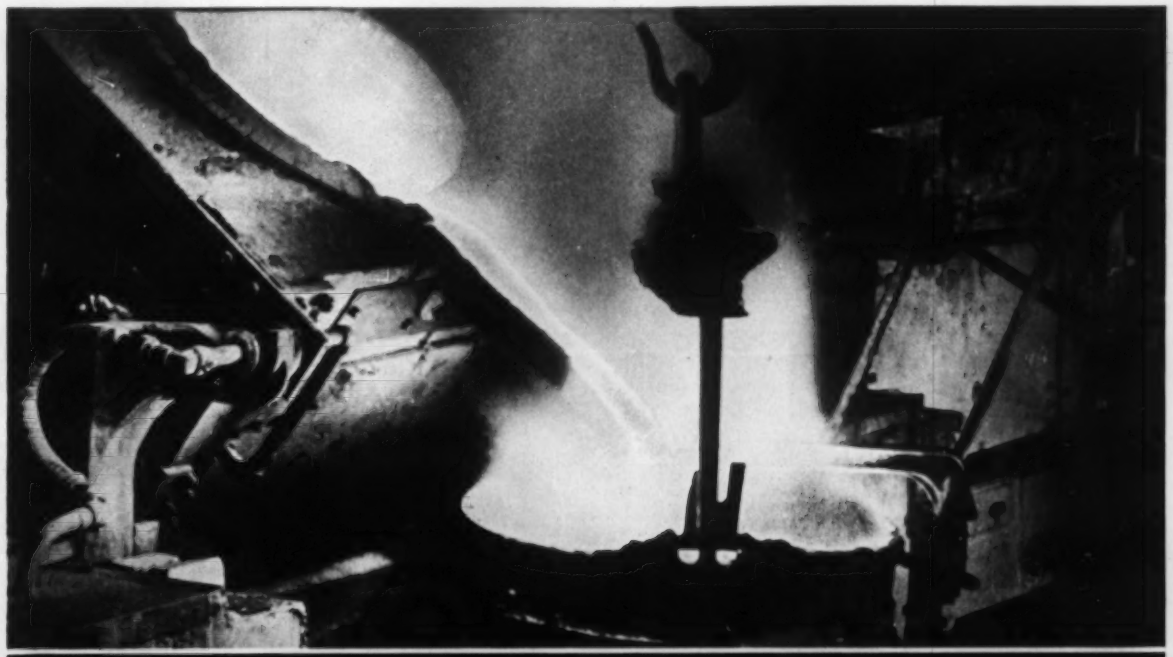
THE BULLARD COMPANY
BRIDGEPORT 2, CONNECTICUT



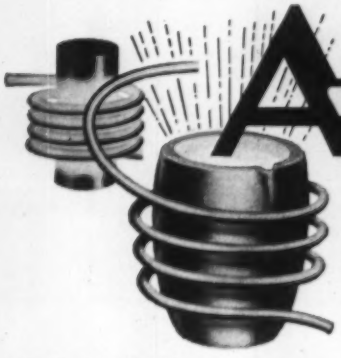
6 tons of steel melted and poured every 2½ hours

SPEED . . . CONTROLLED QUALITY . . . ECONOMY —these advantages are enjoyed on every melt, ferrous or non-ferrous, in Ajax-Northrup induction furnaces. This furnace for example, turns out a six-ton charge of nickel alloy—precisely alloyed and virtually free of impurities—every 2½ hours.

Ajax induction melting puts substantially all the heat in the charge proper. No power is wasted in superheating crucible or refractory, and little heat escapes into the room. Speed of melting and electromagnetic stirring insure perfect alloys every time.

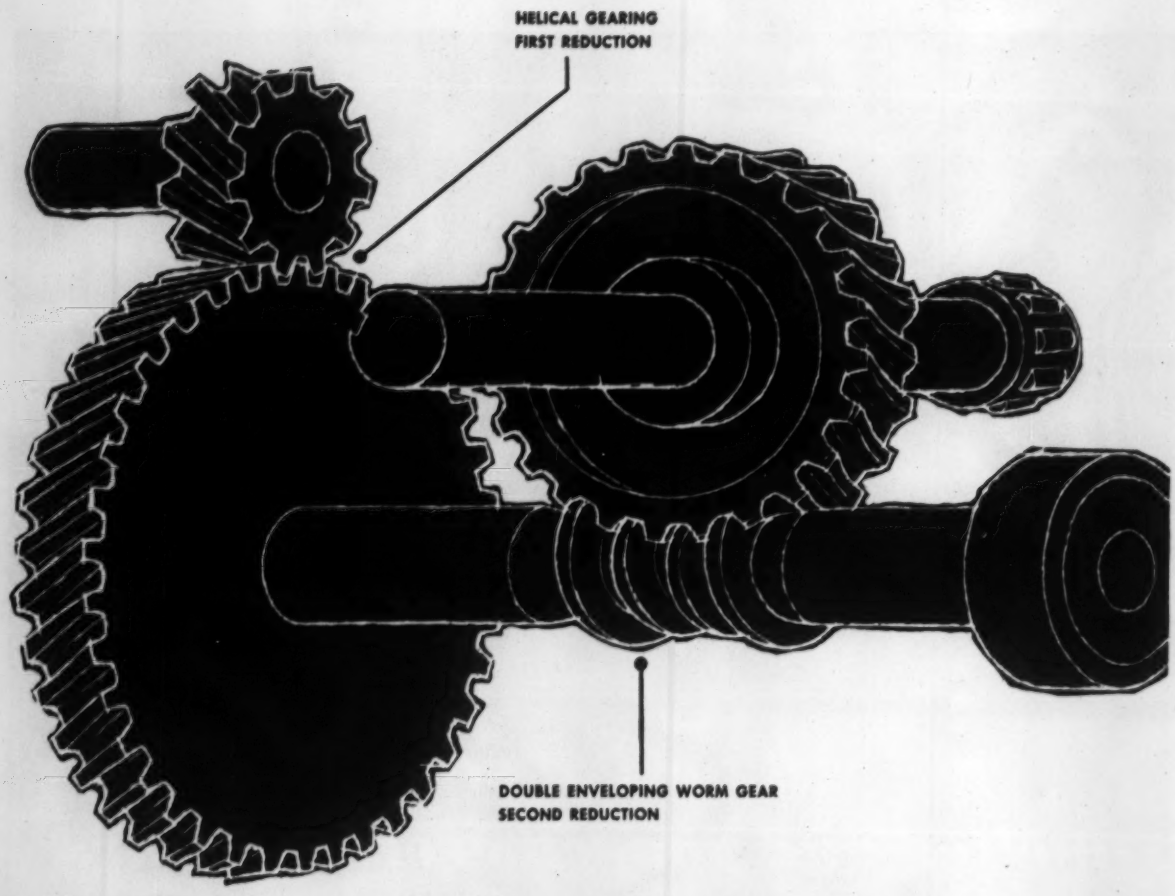
Ajax has been building induction furnaces for all metals since 1916. Installations capable of producing up to 20,000 pounds of metal per hour are in operation, and more and more foundries are switching to Ajax-Northrup melting as they discover its economy and advantages. Learn why in Bulletin 27-B, available upon request to Ajax Electrothermic Corporation, Trenton 5, New Jersey.

Associated Companies: Ajax Electric Company—Ajax Electric Furnace Co.—Ajax Engineering Corp.



AJAX NORTHRUP SINCE 1916

INDUCTION HEATING-MELTING



How Westinghouse new right-angle gearmotor delivers 32% more power

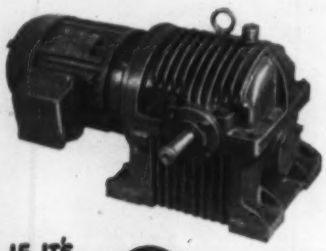
With this exclusive match of gearing, Westinghouse right-angle gearmotor gives you top horsepower and rugged dependability at the lowest cost. It's the result of skillful use of helical gearing to gain maximum efficiency from high lead-angle worm gearing. Over a range of speed reduction, from 20:1 to over 100:1, the Westinghouse right-angle gearmotor *averages* 32% more power than conventional single-reduction, worm gearmotors. At a ratio of 60:1 you actually get 98% more power.

Greater dependability and long life result from Westinghouse exclusive double-enveloping worm gear. It provides 330% more gear-tooth area to support the load. As wear occurs, only double-enveloping gears regenerate or reproduce themselves.

In application, Westinghouse design for high overhung load capacity requires no outboard support. Right-angle gearmotors are available in a complete range of AGMA output speeds and Life-Line® "A" motor enclosures.

FREE detailed facts about Westinghouse new right-angle gearmotor in booklet B-6579. Call your local Westinghouse Sales Office or write Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

J-07349



YOU CAN BE SURE...IF IT'S Westinghouse

Vanadium-Alloys Steel Company

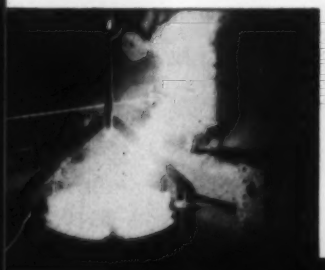
• advanced research

the facts behind

first quality

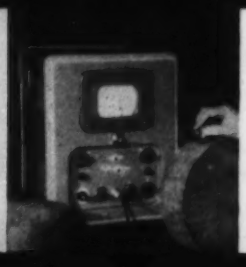
in tool steels—*and in service!*

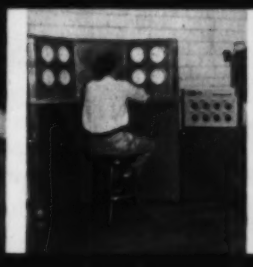
Pictured here are some of the tangibles that assure First Quality in Vanadium-Alloys Steel Company products. Above these modern facilities, however, is the calibre of the men who operate them—men whose experience, in many cases, is as old as the Company—and men in every case whose talents are devoted solely to the production of fine Tool Steel *and nothing less*. Visit us, and see for yourself. We welcome every opportunity to serve you.



• careful melting
• thorough forging
• accurate rolling

complete inspection





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• strategic stocks
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VANADIUM-ALLOYS STEEL COMPANY

Manufacturers of First Quality Tool and Die Steels

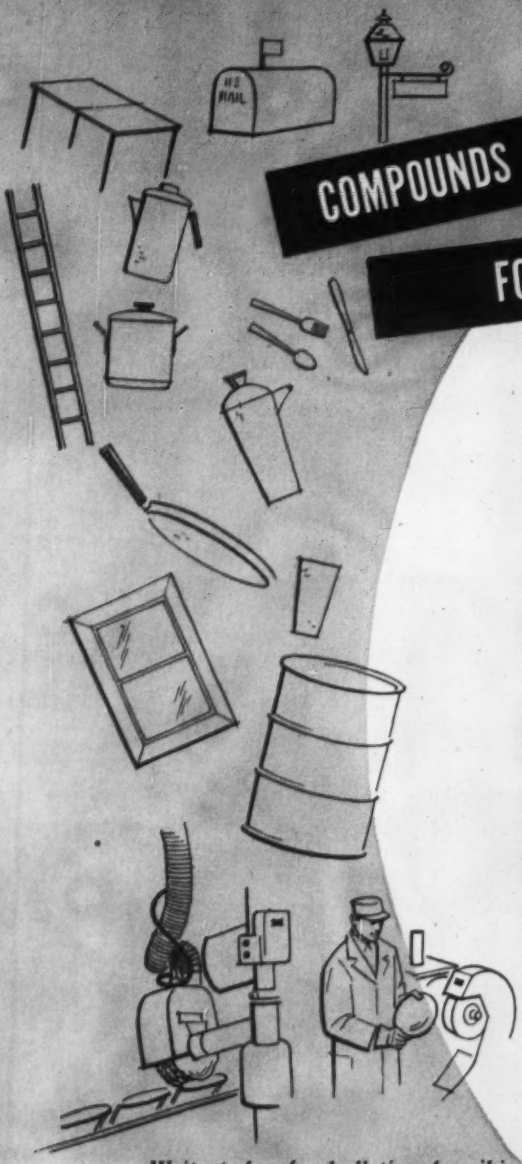
Latrobe, Pennsylvania

COLONIAL STEEL DIVISION • ANCHOR DRAWN STEEL CO.

In Canada: Vanadium-Alloys Steel Canada Limited, London, Ontario

H-VW-M—the manufacturer with...

COMPOUNDS DESIGNED EXCLUSIVELY FOR ALUMINUM FINISHING!



H-VW-M long ago anticipated today's tremendous popular demand for aluminum products—by developing special compounds like Liquimatic 728 to suit the unusual characteristics of this soft metal. Heavy-duty Liquimatic 728 is formulated *expressly* for aluminum finishing. It's a true double duty compound, combining special cutting qualities with excellent coloring properties. And it works so clean, and cleans so easily that it's especially suited for buffing before anodizing. For color anodizing, too, it brings out deeper, richer tones every time.

Liquimatic 728 is just one of a full line of H-VW-M liquid and bar compounds developed solely for use in aluminum finishing. And it's not only compounds that H-VW-M supplies to make aluminum finishing easier . . . faster . . . *better.* In the H-VW-M line you'll find anodizing equipment—automatic buffing machines and other equipment—all types of buffs—everything you need, in fact, from start . . . *to finish!*

Write today for bulletins describing the H-VW-M equipment, supplies and compounds designed especially for aluminum finishing.

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Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

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You'll find, at Crucible, dozens of *prescription-made* cold rolled steels designed for special applications . . . steels for automotive stampings, business machine parts, saw blades, cutting dies, skates, springs and cutlery – to name just a few.

You'll find them in the widest possible variety – including carbon spring, alloy and stainless steels – in fact, in *any* ferrous analysis that can be cold rolled. And you're *sure* of *quality* at Crucible – the nation's leading producer of *special purpose steels* – for Crucible maintains *complete* control of production from ore to finished steel.

So when you need prompt delivery of *any* kind of cold rolled specialty steel *call Crucible.* Experienced Crucible metallurgists can help, too, in selecting the *best* steels for your job. And write for your free copy of Crucible's new 32-page booklet on cold rolled specialty steels. It's packed with useful data. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 30, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

For up and over handling this new American MonoRail Crane offers you the following advantages:

- up to 10 ton capacity
- meets low headroom conditions
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- carrier service beyond craneway
- fingertip control from floor
- all movement power operated
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AMERICAN OVERHEAD HANDLING EQUIPMENT

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"Up-and-Over" is the title of our 16-mm sound film showing how MonoRail solves many tough handling problems at low cost. Please allow us three weeks to schedule a showing for you.

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is the new-strength wire in Roebling's

Royal Blue

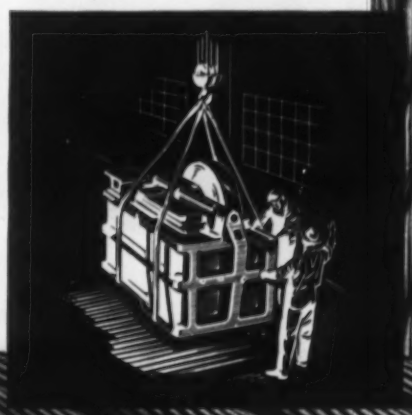
WIRE 1105 ROPE

AS SIZES and constructions go, Royal Blue is like the ropes you have used until now... but the likeness ends there.

Royal Blue is made of Roebling's new 1105 wire, the strongest, toughest wire developed up to now for use in any wire rope.

Royal Blue Wire Rope is as enduring as the wire from which it is made.

Write us for full facts on Royal Blue Wire Rope, or contact your Roebling distributor.



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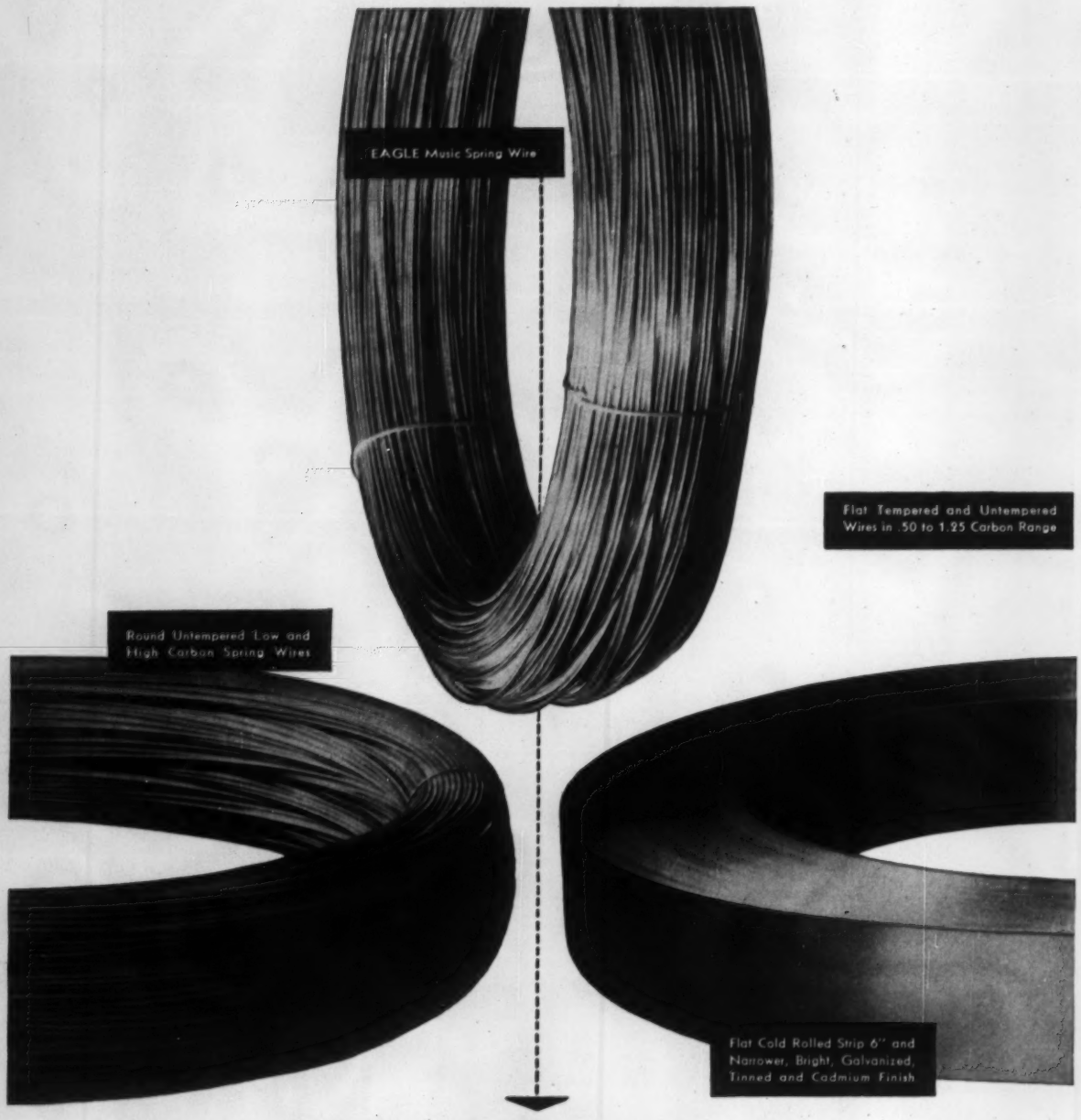
EAGLE Music Spring Wire
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Round Untempered Low and High Carbon Spring Wires
Flat Cold Rolled Strip 6" and Narrower, Bright, Galvanized, Tinned and Cadmium Finish

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WASHBURN

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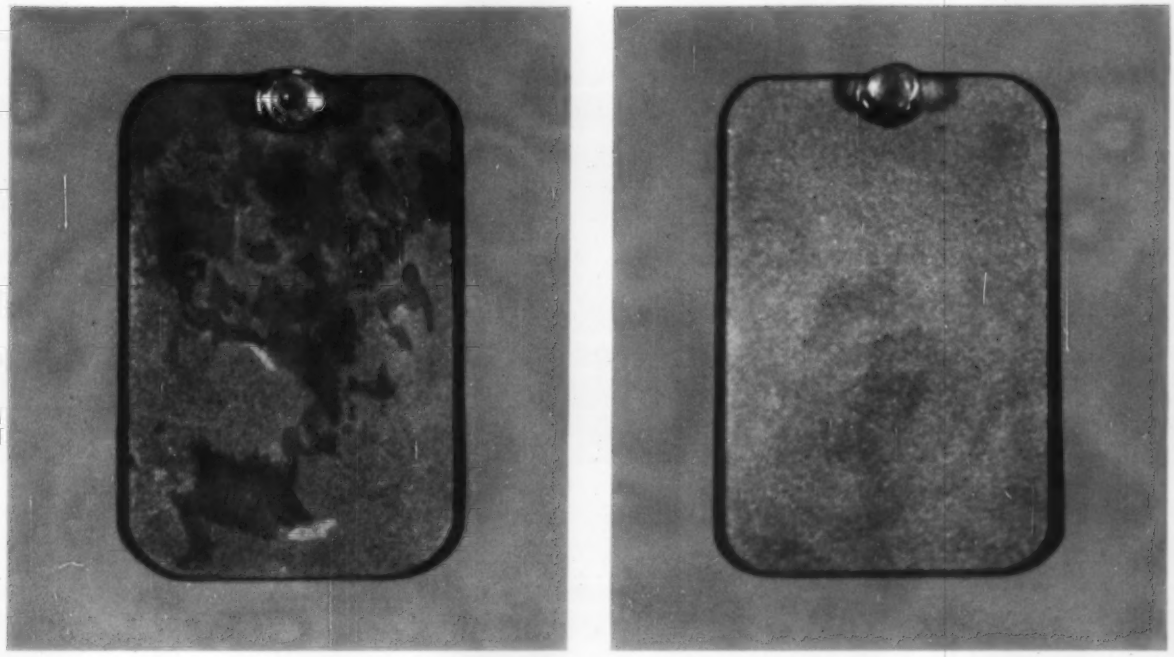
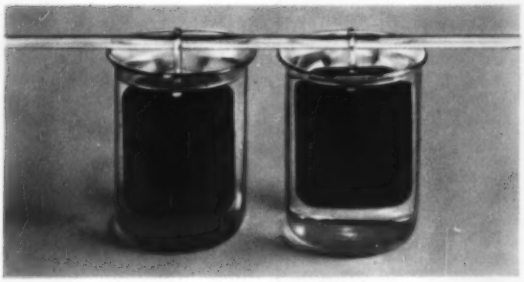
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES



Efficiency of New Sun Rust-Preventive Grease is shown by accelerated test. Rusted test plate (left) was coated with ordinary grease. The large amount of rust was formed during a 48 hour immersion in synthetic sea water. Plate (right) protected by new Sun rust-preventive grease is wholly rust free after 48 hours.

NEW GREASES PREVENT HARMFUL RUST

Sun rust-preventive greases give improved lubrication ...protect against wet or humid operating conditions



In 48 Hour Synthetic Sea Water Test, rust from plate coated with ordinary grease has turned water yellow (left). Water remains crystal clear in beaker with plate protected by new Sun rust-preventive grease (right).

Water contamination in grease-lubricated parts reduces lubricant life, promotes corrosive wear, and may lead to failure of bearing surfaces.

Sun Oil's new rust-preventive greases are specially fortified to overcome this problem. They give extra protection against both direct water contamination and indirect water contamination caused by high humidity and condensation during overnight and week-end shut downs.

Available at the price of ordinary greases, new Sun rust-preventive greases come in many different grades. For complete information, see your Sun representative, or write for Sun Technical Bulletin 38. Address SUN OIL COMPANY, Philadelphia 3, Pa., Dept. GI-1.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

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New buttery grease now protects against rust under highly adverse moisture conditions.

New tacky grease prevents throw-off... reduces consumption. Highly resistant to water.

New high-temperature grease for anti-friction bearings. Exceptional stability, longer life.

NEW SUN RUST-PREVENTIVE GREASES SAVE YOU MONEY IN 3 WAYS

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- **Serve as low-cost rust preventives for storing shop equipment**
- **Save storing and handling special-purpose greases**

Sun Oil Company's new greases are fortified to protect against rust. Lubricity is improved and wear is reduced because grease-lubricated parts are now protected at all times against rust and corrosion caused by condensation and process water.

The effective life of these new rust-preventive greases is approximately twice that of conventional greases operating under wet conditions. And, their extra protection against moisture permits their use as a rust-proofing medium for shop storage of tools and parts.

Competitively priced with ordinary greases, these new greases can be applied by any conventional method... brush, swab, pressure gun, or through central pressure systems.

Because of their improved quality, these new Sun greases will now perform 90% of all grease lubrication jobs. You reduce grease inventories ...lessen the risk of using the wrong grease... simplify your handling problems.

For complete information, see your Sun representative or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. GI-2.

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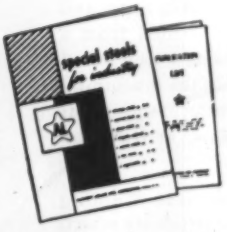

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These qualities in AL Stainless Steel can boost the salespower of a product, or cut the operating costs of equipment—often with little or no increase in first cost. Very likely *you* have problems where these advantages can bring you benefits. Let us work with you. ***Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pennsylvania.***

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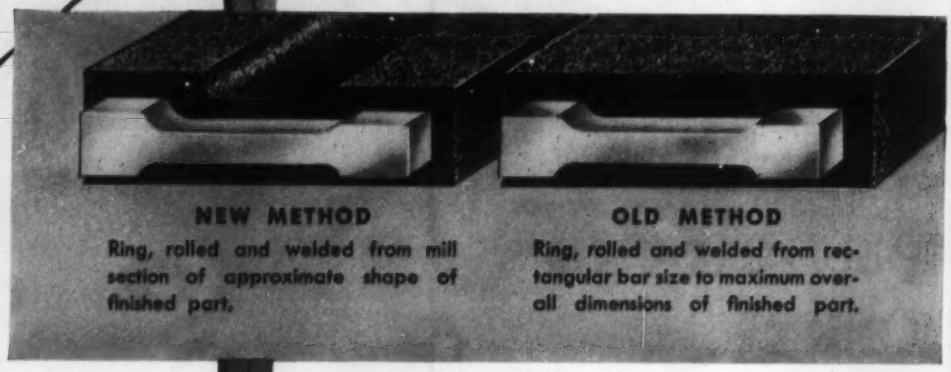

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Ring, rolled and welded from mill section of approximate shape of finished part.

OLD METHOD

Ring, rolled and welded from rectangular bar size to maximum overall dimensions of finished part.

Rough rings purchased by a well known manufacturer of jet aircraft engines weighed 135 pounds each. Most of this weight was excess metal which had to be machined away. American Welding's Industrial Products Division, working with this company, studied blueprints and recommended a flash butt-welded ring, formed from a special mill-rolled section. Adopting this new ring saved 88 pounds of metal and eliminated much of the machining time required. American Welding now produces thousands of these rings, in a rough-machined state, at less than one-quarter of the original cost.

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1955: Normal Auto Year?

Are 1955 auto sales abnormally good? No, says W. J. Simons, Chrysler Corp.'s treasurer. "On the contrary, 1955 is the first year in the entire postwar period that the industry and the economy did not face substantially abnormal conditions of one form or another. It is the first year to give concrete evidence of the underlying strength of consumer demand for automobiles." Automakers plan the largest November-December assemblies in history—1,458,000 cars in the final two months.

All About Ford

After scornfully turning down Ford Motor Co.'s offer last summer for a stock purchase plan for hourly employees, the CIO's UAW now wants the program . . . Ford's 1955 earnings before taxes "will push close to $1 billion," reports *Newsweek*. Ford's 1955 net after taxes "should hit $350 million or somewhat better," the magazine says. The best previous year in Ford's history was 1950, when earnings after taxes reportedly were $250 million.

GNP Soars

Look for the gross national product to hit a record annual rate of $395 billion or better in the fourth quarter. Personal spending and plant expansion sparked a rise in GNP (the nation's total output of goods and services) to a new high annual rate of $391.5 billion in the third quarter.

Construction, Too

Record construction outlays totaling $44 billion will come in 1956, predict the Commerce and Labor departments. That's a 5 per cent hike over the expected $42 billion to be spent on construction this year. The estimate for 1956 would make it the ninth-straight year for record-smashing totals. But the rate of increase in 1956 would be less than in 1955. Major reason: Housing expenditures are leveling out.

Another Steel Expansion

National Steel Corp. will add 1 million tons to its steelmaking capacities in the next three years. It will spend $200 million to $225 million to add 100,000 tons of capacity in 1956, 500,000 in 1957, 200,000 in 1958 and 200,000 in 1959. Slightly more tonnage will be added to National's Great Lakes facilities than to its Weirton units. These additions will just about exhaust the physical possibilities of expansion at both plants, comments National's chairman, E. T. Weir. The next step: An entirely new plant,

possibly to be built in the 1960s. National now has a 6-million-ton capacity, 3.3 million at Great Lakes and 2.7 million at Weirton.

Troubles in Plates

Watch for more steel mill scheduling troubles as the result of the Washington decision to give the St. Lawrence Seaway defense priority. That ruling will give seaway contractors the right to put ratings on their steel orders, primarily for plates and structurals. The chance that any of the allotments to be issued by the Office of Defense Mobilization will hit jammed mill schedules before April gets more remote each day.

Slower Labor Growth

From the end of 1951 to the beginning of 1955, U.S. labor unions signed up little more than 1 million new members. About 20 per cent of that gain came among Canadian affiliates. From 1935 to 1945, union membership shot up from 3.5 million to nearly 14.5 million. Since 1945, gains have been more modest, to bring U.S. and Canada membership now to about 18 million, reports the Bureau of Labor Statistics. These six unions account for one-third of the total: CIO autoworkers, 1,239,000 members; CIO steelworkers, 1,194,000; AFL teamsters, 1,231,000; AFL carpenters, 804,000; AFL electrical workers, 630,000; and AFL machinists, 864,000.

Economy in the Pentagon

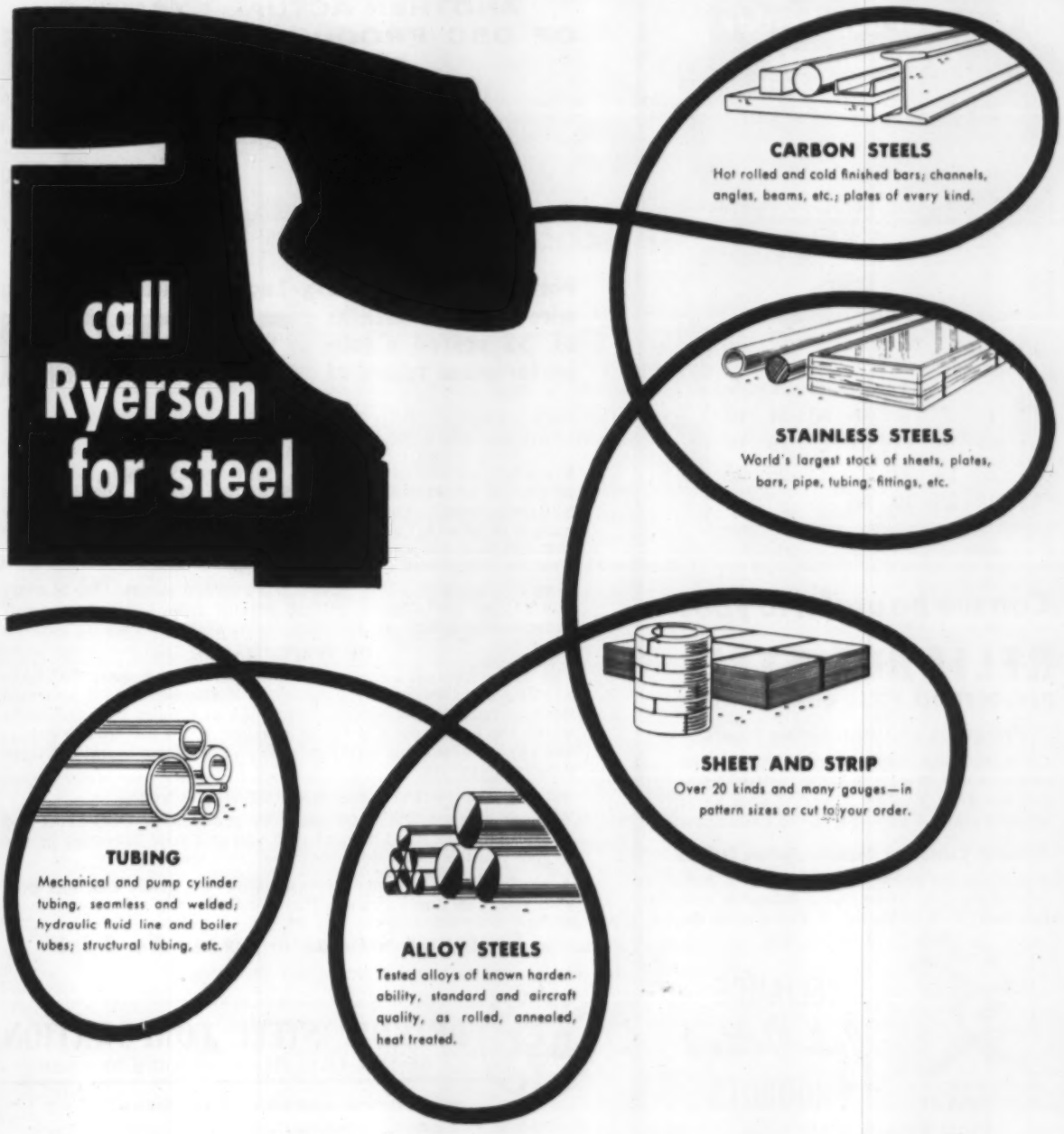
The Defense department is in an all-out drive to save money. Contemplated actions: Better management of research and development; a changed policy on the mobilization base, particularly in the purchase of machine tools; a slowup in deliveries of some aircraft, notably cargo planes and some combat units and engines which haven't worn out so fast as expected.

Ground Rules

You can expect these ground rules to apply when a federal agency is considering bids and foreign applicants are involved: Six per cent will be added to all foreign bids before comparing them with competitive U.S. bids. An additional six per cent will be added to the foreign price when the U.S. bid comes from a labor surplus area. In the first application of the new ground rules, four foreign firms were awarded contracts for electrical equipment, with evaluated bids that were lower than those of domestic manufacturers from labor surplus areas.

Straws in the Wind

A. M. Byers Co. faces another stockholder showdown as insurgents have again asked for a special meeting . . . Packard-Clipper Division of Studebaker-Packard Corp. and the CIO autoworkers have reached a labor agreement patterned after the Ford contract . . . Czechoslovakia will buy 900 Renault cars a year from France; parts will be sent to that Iron Curtain country and vehicles will be assembled there . . . Copper setasides for the first quarter will hit 116 million lb, up 8 million from this period.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		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

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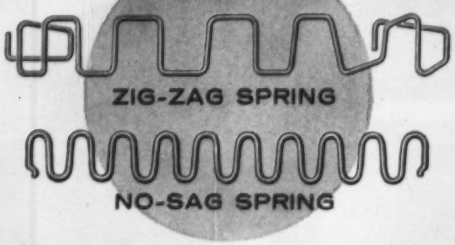
ANOTHER ACTUAL EXAMPLE OF DSC PRODUCT PERFORMANCE



Portsmouth special Zig-Zag and No-Sag spring wire in first 8 months of '55 scored a job-performance record of 99.928%

THE MATERIAL, THE APPLICATIONS, THE PERIOD COVERED

From January through August this year Detroit Steel shipped millions of pounds of PORTSMOUTH SPECIAL HARD DRAWN MB SPRING WIRE. This very substantial tonnage went to leading makers of NO-SAG and ZIG-ZAG spring units for car and furniture seat and back cushions.

THE RECORD

Here's what the 99.928% performance record means: Out of every 100,000 pounds shipped, 99,928 pounds fully satisfied customer expectations; rejections, for all reasons, averaged only 72 pounds.

THE PERFORMANCE

The wire withstood a merciless beating in the high-speed NO-SAG and ZIG-ZAG springmaking machines. Here's why: (1) it possessed the required ductility (formability); (2) its tensiles held uniformly within the limits specified for each gauge; (3) it ran true to gauge; and (4) it was suitably bright in finish and free from harmful surface defects, kinks, etc.

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Whether you use DSC Rod and Wire products or DSC Sheet and Strip, we'll work hand-in-hand with you and your operating people to give you the job performance *you* are after.

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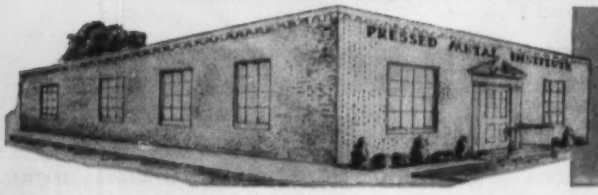

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Leasing: On Ice?

Leasing, an infant but promising marketing device for industrial equipment, is being strangled by bureaucratic fiat.

The negative approach adopted by the Internal Revenue Service and promulgated in its bulletin No. 35 last August is discouraging manufacturers. A survey by the editors of this magazine (Page 52) shows 80 per cent of equipment builders with leasing plans are withdrawing from the field, or are curtailing their leasing activities.

We believe that is unfortunate. Leasing promised to become an important marketing method. To capital goods manufacturers, it offered a means of enlarging outlets for equipment. To users, it promised even more benefits. It could help conserve working capital, or make it possible to get equipment when working capital was not available. It could provide equipment needed for experimental or short-run manufacture. It sometimes offered tax advantages, particularly the postponement of tax liabilities.

Industry was educated to leasing during wartime. Metalworking companies drafted to defense work alien to their normal production were not required to make huge investments in special equipment. Often, the government bought the equipment and leased it to the contractor for the duration of the defense job.

During the post-Korean adjustment, machine tool builders and other manufacturers of industrial equipment became interested in leasing and tried to make it a permanent part of our distribution system.

A major obstacle was uncertainty—what was the attitude of the Internal Revenue Service on the tax aspects of leasing? Industry asked for clarification, hoping to get straightforward answers in bulletin 35. What they got was a document that raises more issues than it settles. IRS mainly is concerned with the possibilities of abuses. It fails to indicate what is permissible.

As a result, many companies are putting their leasing plans on ice until the bureau comes up with positive and realistic rulings and interpretations. Others are continuing their programs in the hope that executive or judicial clarification will be forthcoming. To would-be lessors, we make these suggestions:

Protest the ambiguities of bulletin 35 to the Internal Revenue Service.

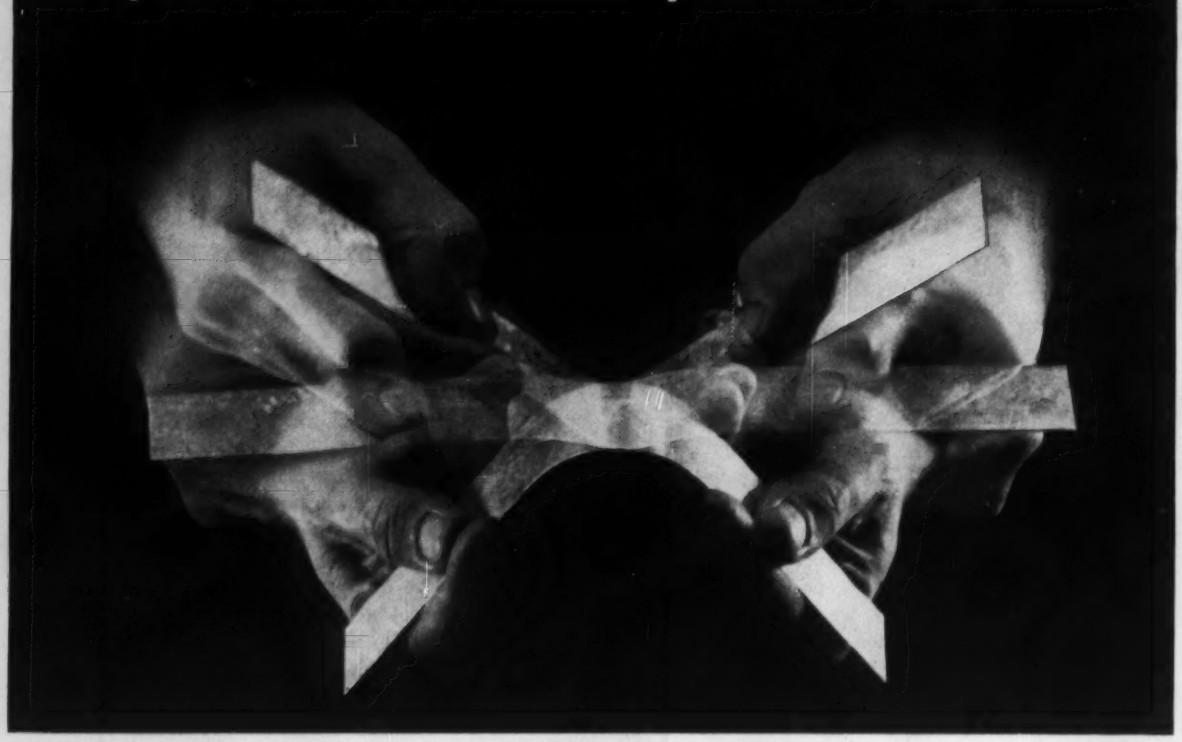
Try to get advance clearance for your individual leasing arrangements. Review your existing plans as carefully as possible. Don't counsel your customers. No one can anticipate IRS rulings.

Remember that when you sell to a leasing company, it still is your product in the eyes of the user. You still have customer liability.

Walter J. Campbell

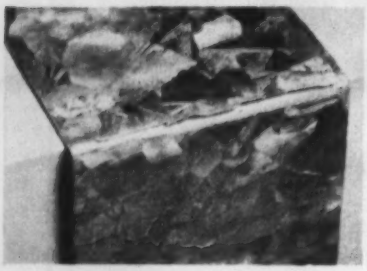
MANAGING EDITOR

Can your Galvanized Sheets pass the "bend test"?

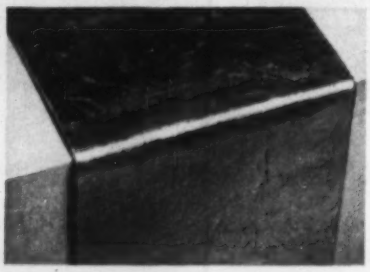


Just take a piece of the galvanized you're now using—bend it back and forth a few times. Do the same thing with a sample of Inland Ti-Co (which we'll gladly send you). Now look at the coating where the sheets were bent. We know the Ti-Co didn't flake—but did *your* galvanized? You can see for yourself why Ti-Co will improve your products, cut manufacturing costs and practically eliminate rejects.

Here are results of identical laboratory-controlled bend tests:



CONVENTIONAL "POT-DIP" GALVANIZED. *See where coating cracked and flaked off. Reason: brittle alloy layer which exists between zinc coat and steel.*



INLAND TI-CO. *No cracks or flaking after bending. Patented Ti-Co manufacturing process virtually eliminates brittle alloy layer, applies a tight zinc coat that withstands any forming that the base steel will take.*

Ordinary bending is probably the simplest forming your galvanized sheets will ever be called on to take. But the zinc coating on Inland Ti-Co will stand up under really tough punishment, too. You can lock-seam it, draw it, pound it, nail it . . . and Ti-Co's tough, tight, corrosion-resistant coating stays snug to the steel. Rust is sealed out!

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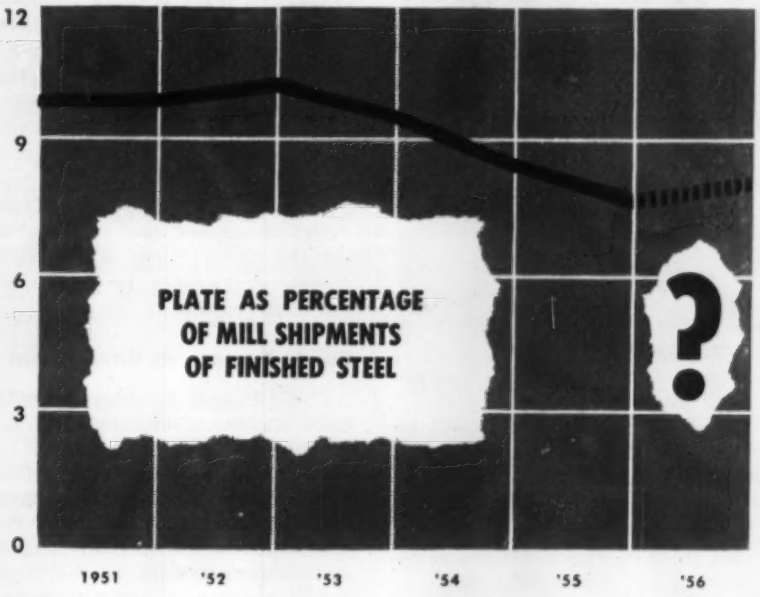


With unfilled orders spilling over into 1956 . . .

Steel Plate Shipments Lag

THE SHORTAGE of steel plate is approaching famine levels. Orders are stacking up so fast that producers are already closing books for the first quarter of next year. There's little immediate chance of improvement.

While boosting ingot capacity more than 20 per cent between 1951 and 1954, steel companies increased plate capacity only 4 per cent. In fact, plate capacity has declined more than 2 million tons since 1945. But producers are not convinced capacity is inadequate to handle a "normal" market.

Why?—Many steel plate users —such as shipbuilding and military tanks—are notoriously unpredictable. Their activity cannot be related to the normal growth of metalworking. In 1954, steel plate shipments were down 14 per cent from 1948, while metalworking sales were up 56 per cent. One explanation for the current pile-up is that sizable orders from these customers and from the railroad freight car programs are coming in simultaneously.

Cost — Steel plate does have some steadier important customers, machinery and construction among them. But when tonnage is required to satisfy more than these markets, plate has to compete with other steel mill products for every ton of ingot.

In wartime, the government steps in with orders for strip mill plate. In 1953, for example, at the height of the Korean War, plate production was better than 1 million tons above the industry's rated capacity for this reason. But in normal times, no steel company is likely to divert much strip mill steel to plates, when it can process it further into cold-rolled sheet and make better profits.

Planning—The consensus of producers is that while the present plate situation may be painful to fabricators, it is probably temporary. Most of them have a wait-and-see attitude. Of the major platemakers contacted by STEEL, only one plans any addition to capacity, and it's still not ready for an announcement.

Any installation being planned could have little effect before 1957. One other company hopes to step up production through improved operating techniques. On Dec. 1 Colorado Fuel & Iron Corp.'s Claymont Division will get its 180,000-ton mill back into action, after a five-month time-out for repair. None of these plans can have much influence on the immediate situation.

Underestimated? — It's possible that platemakers may be unduly skeptical of the long-term health of their market. Activity in the machinery and construction fields will be pushing records again in 1956. A major new round of pipeline building may be coming. One Canadian gas pipeline alone will take as much plate as the U. S. industry can turn out in 2.5 months.

Major expansions are predicted in the chemical and process fields. Starting the ball rolling, Standard Oil of New Jersey will spend $300 million on refinery expansion next year. And shipbuilding is perking up. Arthur S. Flemming, defense mobilization director, is keeping the expansion goal for heavy steel plate open—making such facilities the only steel mill equipment still eligible for fast tax write-offs.

Short Term — Fabricators take some comfort in predictions that the auto industry may drop its take of cold-rolled sheet substantially in the third quarter, 1956. That could make more plate available almost immediately. Another possibility: Demand may push the market price of plate high enough to warrant more strip mill plate output. Foreign plate is base-priced $50 a ton above the domestic market. All that comes in is being snapped up. The situation makes plate one of the leading candidates for spot price increases predicted in STEEL's Nov. 14 issue, page 59.

Builds Refractories Plant

Harbison - Walker Refractories Co. has completed construction of a plant at Leslie, Cecil county, Maryland. It will produce silica refractories.

Granite City Boosts Output

Illinois steel company plans 30-per-cent addition to ingot capacity by 1958. The program will be built around a new blast furnace and improvements to open hearths

GRANITE City Steel Co. will boost ingot capacity more than 300,000 tons by 1958. Its capacity today is 1,180,000 ingot tons.

John N. Marshall, president and board chairman, explains: "In effect, we will be rounding out our production facilities. Our hot-rolling mills can handle more steel than our open-hearth furnaces can produce. By increasing blast furnace and open-hearth capacity, we will boost current shipments substantially, without the tremendous cost involved in building wholly new facilities."

Benefit—The first effects of the 30-per-cent expansion program will be felt late next year, when hot-rolled coil and sheet output will be stepped up. Nearer the end of the program, Granite City will also be able to boost output of cold-rolled sheet.

Koppers Co., Pittsburgh, will start building a new blast furnace for the expansion this month. Its capacity will be about 1200 tons of pig iron a day, twice that of Granite City's smaller blast furnace—to be torn down to make room for the new unit. The new furnace, which will have a hearth 25 ft in diameter, will go into place next March and will be blown in some four months later.

Time Savers—Granite City will also step up the capacity of its open hearths. Doors have been redesigned to permit use of 61-cu-ft charging boxes for scrap loading. Combined with additional pig iron from the new blast furnace, this and other improvements are calculated to cut steelmaking time.

Granite City's main offices and plant are across the Mississippi river from St. Louis, in Granite City, Ill. Primary market areas are St. Louis, the Midwest and the Southwest.

Steel Plant in Peru

Peru's first steel plant will be in operation by this time next year.

Located at the port of Chimbote (262 miles north of Lima), the $25-million plant is being financed by French capital. It will have an initial annual capacity of 60,000 tons, which can be expanded to more than a million tons a year.

Power comes from a hydroelectric project being built in Canon de Pato, 87 miles inland.

Ramseyer & Miller Inc. (New York) engineers are consultants for the Santa Corp., a Peruvian government agency in charge of the dual project.

Builds Furnace in Birmingham

U. S. Pipe & Foundry Co. will build another blast furnace at its Birmingham plant.

Construction on the multimillion dollar project starts in about three weeks. Finish date is around June, 1957. This is the company's fifth and largest furnace in the area. It will increase capacities from 50,000 to 80,000 tons per month.

Rust Engineering Co. of Birmingham was awarded the contract.

Ore Boats Set Shipping Record

Pittsburgh Steampship's 59 ore carriers have hauled some 23.8 million tons of ore this year—a peacetime record and the fourth best year in the history of this U. S. Steel Corp. division.

Its record haul was 27.4 million tons in 1953 during the Korean War.

The last cargo of ore probably will be loaded about Nov. 27. Most of the boats already are putting in for the winter. Three Pittsburgh boats will haul limestone in Lake Michigan until about Dec. 15.

Link-Belt and Syntron Merge

Link-Belt Co., Chicago, has merged with Syntron Co., Homer City, Pa. Link-Belt makes materials handling, processing and power transmission machinery. Syntron, which will be operated as a subsidiary of Link-Belt, makes an extensive line of feeders and other equipment using pulsating magnetic vibration for the controlled movement of materials. It also produces selenium rectifiers, portable power tools, shaft seals and miscellaneous allied products. The consolidated firm plans to in-

Railroad Crossings Will Be Smoother

Erie Railroad workers put center section of rubber and steel crossing in place at Salem, O. Made by Goodyear Tire & Rubber Co., the rubber slabs are bonded on 7-gage steel, replacing the traditional materials

troduce several new products and to enlarge its manufacturing facilities.

Buys Hydraulic Press Line

Farrel-Birmingham Co. Inc., Ansonia, Conn., acquired the business of the Press Division of Watson-Stillman Co., Roselle, N. J. The purchase did not include any portion of the Roselle plant where Watson-Stillman, a division of H. K. Porter Company Inc., will continue the manufacture of other products.

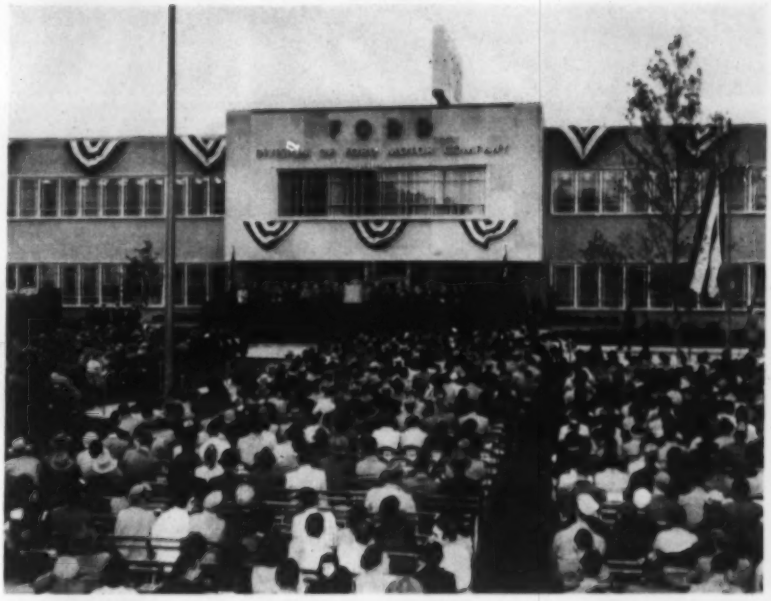
Ford Expands St. Louis Plant

Ford is increasing the size and production capacity of its St. Louis Mercury plant by more than 25 per cent. Two new wings and a new bay extending the full length of the main assembly building will be added. This will bring the manufacturing area up to more than 1,070,000 sq ft. Work is scheduled to be completed in October, 1956, says F. C. Reith, general manager of the Mercury Division and vice president of Ford Motor Co.

The company also announced liquidation of its wholly owned subsidiary, Wood Bros. Inc., Des Moines, Iowa. The plant, operated by Ford's Tractor & Implement Division, with headquarters in Birmingham, Mich., will continue to produce major types of harvesting equipment. Irving A. Duffy, Ford vice president, is divisional general manager.

Chrysler Buys Parts Firm

Chrysler Corp., Detroit, acquired the plants, equipment and inventories of Universal Products Co. and its wholly owned subsidiary, Formetal Co. Purchase price was more than $3.5 million. The properties will be operated as the Detroit Universal Division under the direction of R. S. Bright, general manager of the corporation's Supply Division. Universal Products makes automobile drive shafts and their components, including universal joints, in Dearborn, Mich. Formetal makes stampings and forgings at its plant in Ecorse, Mich.



Ford assembly plant at Louisville is new addition as . . .

Automakers Expand Again

AUTOMOTIVE'S Big Three are still building.

Chrysler Corp. plans to spend more than $1 billion for expansion in the next five years.

L. L. Colbert, Chrysler president, says the money is going into capital improvements and expansion exclusive of tooling. The program will include facilities for making passenger car bodies, construction of new assembly plants, new office buildings, an enlarged engineering program and expansion and modernization of engine, transmission and parts plants.

More for Research—Mr. Colbert adds that Chrysler will push research on gas turbine engines, electronics, and nuclear and solar energy. "It may well be that if the company continues to move in the years ahead as it has in 1955, we will find it necessary to revise our investment plans upward," Mr. Colbert asserts.

Another Ford Plant—Ford Motor Co. also is slicing off another chunk of its $3.7-billion post war expansion fund. The company will build a 1.2-million-sq-ft plant near Columbus, O. It will turn out steering gear apparatus and parts.

While the cost of the project has not been announced, some sources estimate the building alone will run close to $14.4 million.

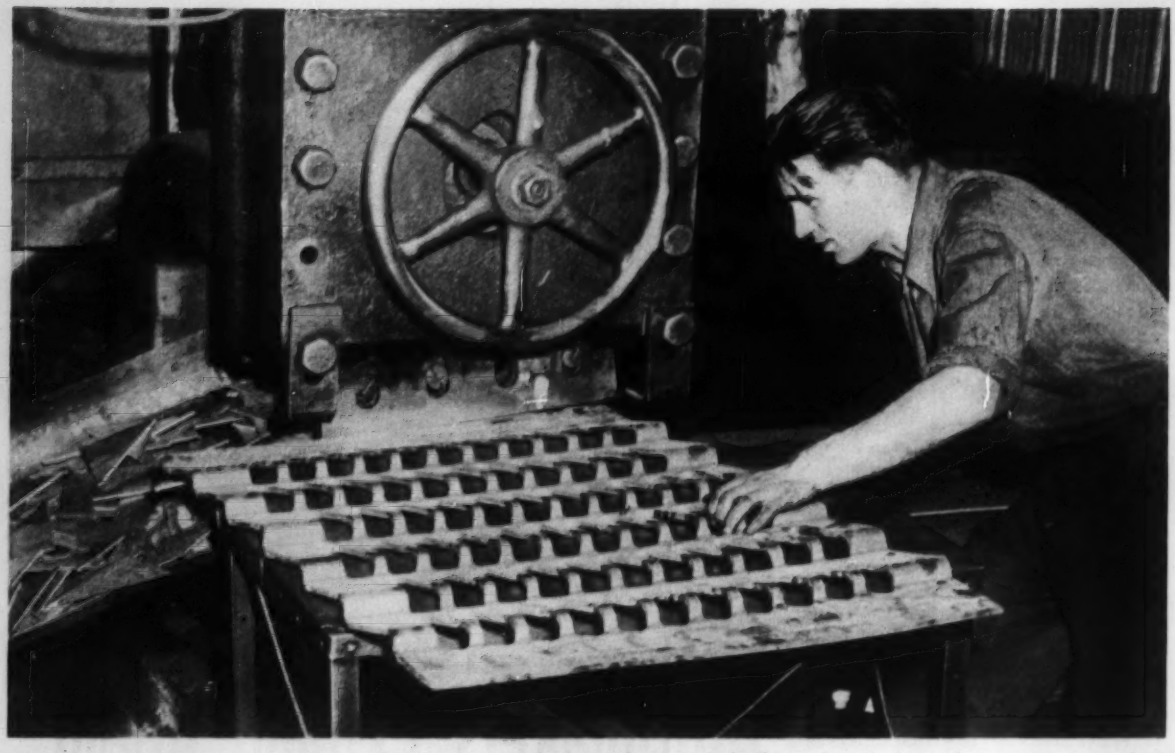
Right Now—Ford is waiting routine re-zoning approval from the Columbus city council. Construction is expected to start this winter. The plant will be completed by mid-1957, according to A. R. Wardrop, general manager of Ford's General Manufacturing Division in Dearborn, Mich.

Meanwhile — General Motors Corp. is noncommittal, following the Senate Committee's hearing on size and structure of its organization. GM has put some $4 billion into expansion programs here and in Canada since World War II.

Late GM additions are stamping plants at Marion and Mansfield, O.

GM Buys Toledo Factory

General Motors Corp.'s Chevrolet Motor Division, Detroit, purchased Martin-Parry Corp.'s factory at Toledo, O., as an added facility for the manufacture of automatic transmissions.



Perforated, annealed, flanged and sheared to size at Hendrick Mfg. Co., Carbondale, Pa., ⅜-in. steel plate will screen coal

Biggest customers are having a good year so . . .

Perforated Metal Sales Rise

PRODUCERS are confident for next year, too. Most perforated metal firms report business is better than last year's and expect further increases. Typical comment: "1956 looks excellent," says William Wegner, sales manager, Standard Stamping & Perforating Co., Chicago.

Prime reason for the bright outlook: Biggest users are auto and farm equipment makers and builders of screening equipment used by producers of coal, gravel and crushed stone. Business in those industries is good to terrific this year, should pick up more in 1956 (except perhaps autos, but others will take up the slack).

Materials Short—To stretch a point, business may be a little too good. Steel is the biggest tonnage item that the perforators use; most say their biggest business problem is to get enough steel.

Another headache: Customers want delivery "day before yesterday, and we can give it to them if they are willing to pay for the service," says John C. Eidt, president, Manhattan Perforated Metal Co. Inc., Long Island City, N. Y.

Deliveries — Ordinarily, though, deliveries run three to five weeks, longer if the raw material is an especially tight one. "For example," says one producer, "on Monel and similar alloys the deliveries being promised are August, 1956."

As in other metalworking lines, technological improvements have come to perforating. "Engineering research has accomplished some spectacular results," states J. E. Fuller, president, Harrington & King Perforating Co., Chicago. "The rule of thumb that the diameter of a hole punched into a sheet of steel cannot exceed the thickness has been far exceeded. Experimentally, we have punched a ⅛-in. round hole in ⅜-in. steel.

Buying—Many perforating machines are special equipment. Several firms design their own; a few even build them.

"Our new equipment buying continues at a rather steady rate," says T. A. Warner, sales manager, Hendrick Mfg. Co., Carbondale, Pa.

Prices—Perforated metal prices are due to take a jump soon. Says one executive: "There are comparatively few perforating companies in the country. Despite this, we all have sharp pencils for desirable business. Our pricing definitely has not kept pace with increases and prime costs, but our continuous efforts to modify present equipment has allowed us to continue operating at a fair profit. If raw materials prices go up, it will not be possible to hold the line pricewise."

Here's a hot prospect for a sales boom . . .

Electric Heating: Sales Up

AIR CONDITIONING is giving a big boost to the electrical heating business. It has made summer the peak load season in many areas. To balance out, many utilities are actively boosting electrical heating.

The National Electrical Manufacturers Association, New York, says 58 per cent of power suppliers favor electric heating, 26 per cent are neutral, only 16 per cent are against it.

Installations — About 300,000 homes are completely heated by electricity. About 40,000 to 50,000 new installations are being added each year. Electromode Corp., Rochester, N. Y., says: "The industry is just around the corner—watch sales snowball."

Another company, not in existence six years ago, sells over $1 million worth of radiant heating panels a year (made of glass, they are mounted on walls). Sales have just scratched the surface, says the company.

Radiant panels and wall-mounted convectors make up about 60 per cent of installations. In many northern areas panels were first on the market and got off to an early sales lead.

The other 40 per cent are baseboard and radiant systems. They use resistance wire embedded in plaster ceilings, or in prefabricated panels for ceiling installations. They are growing fast in all areas; it's predicted that eventually they may make up 65 to 70 per cent of all installations.

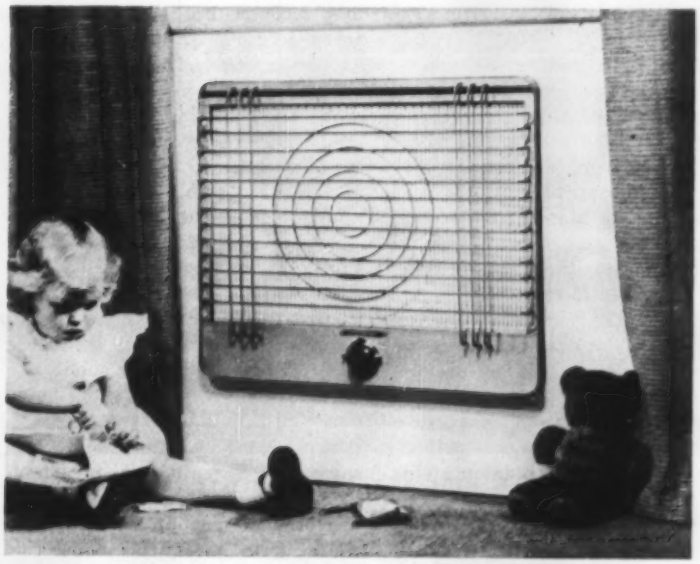
Another Competitor — Sales of heat pumps started in Florida and the Gulf states in 1951. Now they have hit the big cities in the North.

The heat pump uses an electric motor to run a compressor. In summer, it extracts heat from inside the house and pumps it outside. During the winter, heat is taken from an outside source, such as air, the ground or a well. The outside coil frosting problem seems to have been solved by a new defrosting process.

Installations are divided evenly—4000 units are in homes, 4000 are in businesses. But home sales (now 60 per cent) are climbing.

Installed costs range from $1800 to $3000. Units are of 3 or 5 hp. Most systems cut in coil heaters to supply additional heat when the outside temperature drops below 15 to 25° F.

Sales next year are expected to double this year's. General Electric Co. estimates that industry sales in 1965 will be 300,000 units. By then, 1¼-million heat pumps are expected to be in operation.



Electric heating (here wall panels) is a fast growing newcomer

Businessmen Pick Issue

More than 4800 businessmen believe that two legislative issues, tax revisions and reductions, will have greatest impact on the competitive enterprise system.

A survey by the U. S. Chamber of Commerce asked industrialists which ten legislative issues facing the next session of Congress would most affect the business world.

Federal and state right-to-work laws and retention of flexible farm price supports ranked second and third.

An expanded federal highway system and federal-versus-private development of water resources were fourth and fifth.

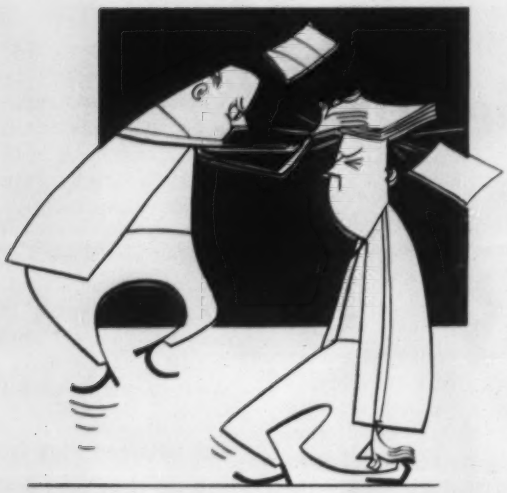
The other five issues, listed in order, are: Laws governing welfare funds, expanded social security coverage and rates, wider minimum wage coverage, efforts to broaden federal aid for school construction and elimination of control over independent producers of natural gas.

Germans Boost Diesel Output

Monthly production of air-cooled diesels has hit 20,000 cylinder units at Kloeckner - Humboldt-Deutz A. G., Cologne, Germany.

Production for the first ten months is 65 per cent over the same period of last year.

Hans K. Breustedt, vice president of Diesel Energy Corp., New York, the U. S. representative of the German firm, says output has jumped from 1900 engines in 1947-48 to 38,000 in 1954-55. The average horsepower is 29.6, almost twice what it was in the earlier period.



IRS Bulletin 35 deals a . . .

Blow to Equipment Leasing

"WE ARE now 'out of business' on leasing until the Internal Revenue Service modifies its rules."

So says Cherry-Burrell Corp., Chicago. The "rules" are the new Revenue Rulings No. 55-540, 541 and 542 contained in Bulletin No. 35 of the Internal Revenue Service, dated Aug. 29, 1955.

Troubles—In a survey of metalworking companies that do leasing, STEEL finds that 80 per cent believe that Bulletin 35 has or will hurt industrial equipment leasing. Some 20 per cent think it will have no effect. Nobody thinks it will help.

Says J. A. Swaney of Harris-Seybold Co., Cleveland: "Prior to Bulletin 35, leasing was well on its way to assuming a definite place in the marketing of heavy industrial equipment, but that ruling has placed a shadow over the entire program. Until a test case is carried to the U. S. Supreme Court, leasing must be considered to be on ice." Says Kenneth W. Palmer of Chambersburg Engineering Co., Chambersburg, Pa.: "Bulletin 35 appears to raise more issues than it settles."

The Issue — What's the furor about? It has been building steam steadily in the three months since Bulletin 35 came out. It was IRS's long-awaited statement of its position on the tax aspects of leasing. The first portion (Ruling 55-540) is general and lists a series of criteria, adopted for the most part from language in landmark court decisions. They determine whether an agreement is a lease or a conditional sale. The next two parts (55-541 and 542) are primarily examples, presumably based on the general criteria of 540.

Industry had hoped that with this statement the government would:

1. Clarify its position on when a lease is a lease, and when it is simply a conditional sale. (If a "lease" is ruled a conditional sale, tax postponement advantages of the "lease" disappear.)

2. Modify its stand, so that in lease accounting depreciation methods other than the straight-line method are allowed.

3. Simplify its language and be more positive in its examples, so that its rulings can be better understood.

Results—On the conditional sale issue, "the restrictions are rather severe, and, in my opinion, will make most existing leases ineffective," says L. J. Skoner of DoAll Co., Des Plaines, Ill.

"It narrows, not broadens, the conditions under which the lease is a true lease," charges Frank Griesinger of Lincoln Electric Co., Cleveland (for examples, see STEEL, Sept. 19, p. 71).

On the depreciation issue, listen to Cherry-Burrell's F. A. Lackner: "Bulletin 35 has completely neglected the recent changes in allowable methods of depreciation (on regular sales) and is sticking to the straight-line system or an equivalent. Apparently, the left hand knoweth not what the right hand doeth."

On the issue of clarity, hear D. L. Salinger, of Walter E. Heller & Co., an industrial and commercial financing firm: "The rulings fail to give positive guides to what is permissible in a lease, and they introduce some new conceptions which are rather confusing."

Charges Machinery & Allied Products Institute in a seven-page critique: "One of the fundamental defects is the consistently negative approach which focuses almost entirely on the possibilities of abuse of leasing arrangements."

Negative—Because of those defects, most students of the subject believe that leasing will decline until the Treasury department comes up with new rulings or the courts adjudicate. Aside from tax uncertainties, the rulings could play hob with the accounting procedures of lessors and lessees.

Of couse, many leasing plans are still considered true leases. A firm that has traditionally leased and never sold its equipment appears on firm ground. The leasing companies seem in good shape. In general, those leasing plans with a tenure closely paralleling the "useful life" assigned to the equipment in IRS's Bulletin F get a nod of approval from the service.

Exception — Kearney & Trecker Corp., Milwaukee, is one of the firms that believes Bulletin 35 will mean no curtailment in its leasing program. "It is not, and has never been, our intention to sponsor a device whereby a shift or deferment of tax liability not contemplated by law would be achieved," says the corporation's president, Francis J. Trecker. "We have endeavored to set up a true lease contract to meet the bona fide situations where solid business rea-

sons make leasing preferable to purchasing."

K & T estimates that about 6 per cent of its business volume for 1955 is coming from rentals, compared with some 4 per cent in 1954. The 1956 leasing volume should hit 6 to 8 per cent. Clark Equipment Co., Buchanan, Mich., another firm that sees no effect on its activities from Bulletin 35, says about 20 per cent of its volume results from leases. That ratio may grow to 25 per cent in 1956.

Agreement—Whatever their position on Bulletin 35, most metalworking executives whose companies lease agree with J. H. Lewis of Lewis-Shepard Products Inc.: "Leasing has probably won a permanent—although minor—place in our industrial marketing system."

Those dissatisfied with Bulletin 35 believe it's possible to get IRS to modify its position before too much damage is done (see STEEL's editorial, page 45). In the interim, many experts advise: Get advance clearance with IRS on individual leasing deals. That usually takes one to six months.

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Businessman's Atom

Five-day conference will stress ways to put nuclear energy to work in industry

DOLLARS - AND - CENTS atomic business will be the attraction for visitors to the Nuclear Engineering and Science Congress at Cleveland, Dec. 12-16. They'll also see an International Atomic Exposition.

Theme — A two-day industrial program will be built around the theme that you don't need the capital, equipment or massed brains of an AEC to put the atom to work in your business. Three sample talks from the Dec. 15 program: "Getting Into the Nuclear Field—A Report to the Board;" "Setting the Budget for Your Small Hot Atomic Laboratory;" "Atomic Energy and Its Place in Your Business."

The scientific program covers the full five days. Among the 300 technical papers are a number on workaday aspects of the atom: Uses for nuclear energy in typical industrial research projects, economics of small nuclear power packages and medical, legal and insurance problems.

Two Sides—Exhibitors have been urged to remember the dual nature of the audience; there will be atomic ABC's, as well as technical displays by the 160 exhibitors from the U. S. and abroad.

The conference is being co-ordinated by the Engineers Joint Council, New York. The exposition is sponsored by the American Institute of Chemical Engineers. Registration is through the Cleveland Engineering Society, 2136 E. 19th St., Cleveland 15, O.

Porter Acquires Disston

The H. K. Porter Company Inc., Pittsburgh, has acquired Henry Disston & Sons Inc., Philadelphia.

T. M. Evans, president of the Porter company, announced that Disston, maker of saws, industrial tools and tool steel, will operate as the Henry Disston Division.

In another move, Mr. Evans disclosed that the firm of Carlson & Sullivan Inc., Monrovia, Calif., also will merge with Porter. The company makes steel rules and measures. It will be a part of the new division.

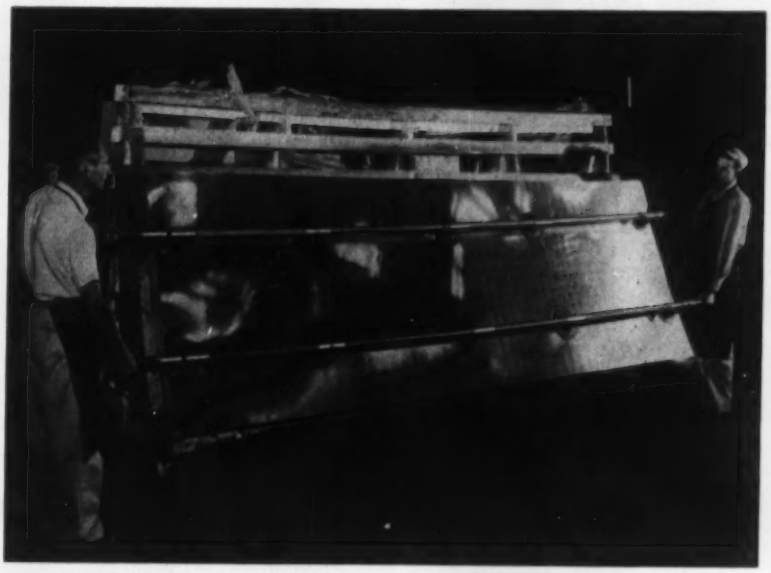
Disston formerly was in competition with another Porter division, Vulcan Crucible Steel Co., Aliquippa, Pa., which also manufactures tools and special tool steels.

Lawrence L. Garber, a Porter vice president, has been named general manager of the division. He recently has been general manager of Porters' Alloy Metal Wire Division, Prospect Park, Pa. Emmett Mann, present sales manager at Alloy, will succeed Mr. Garber.

John Thompson, Disston's president, is retiring. Jacob S. Disston, board chairman, and Horace Disston, former chairman, probably will serve in a consulting capacity.

Installs Annealing Furnaces

Six new elevator-type electric annealing furnaces have been placed in operation at Allis-Chalmers Mfg. Co.'s Pittsburgh Works for heat-treating semiprocessed transformer core steel. Each of the 15-ton, 360-kw furnaces heats the steel for several hours around 2000°F in a controlled atmosphere of hydrogen.



Vacuum Lifts Protect Aircraft Skin from Damage

General Dynamics Corp.'s Convair Division (Fort Worth, Tex.) moves unwieldy aluminum sheet stock by static vacuum bars. Suction cups attached to aluminum bars are applied to the metal sheet with hand pressure. Convair-Fort Worth plans other vacuum applications to protect metals from nicks and scratches

Federal agencies team up on $460-million kitty to see that . . .

Small Firms Get Fair Share

A FAIR SHARE of government business for small firms—that's the aim of a new joint program of the Small Business Administration and General Services Administration, which buys about $460 million worth of goods and services annually.

Being developed are procedures for joint screening of procurement to be earmarked for exclusive competitive award to small business. As requirements are set aside, the Business Service Centers in GSA's ten regional offices and SBA's 14 regional and 25 branch offices will be notified.

The joint program began a trial run at GSA's New York office in September. So far, procurements amounting to $855,000 have been reserved for award by competitive bidding to small business concerns.

Focus on T-H, Steel

No changes in the Taft-Hartley Act will be made by the next Congress, predicts James P. Mitchell, secretary of Labor. But he will try to get action on five non-T.H. administration bills. Among them: 1. Required overtime pay to workers under federal contract if their workweek goes over 40 hours in five 8-hour days. 2. Federal financial and technical help to states for developing job safety programs.

Steel shortage is getting increasing attention in Washington. BDSA officials say production directives for priority materials are currently running two and one-half times over the weekly average of the last six months. The rise is expected to continue into next year.

Flood Insurance Plan

Disaster insurance is sure to get a workout when Congress reconvenes. The latest plan, drafted by Rep. Thomas J. Dodd (Dem., Conn.), would provide three basic types:

1. Insurance providing cash reimbursement for those who can afford that kind of protection.
2. Reimbursement in the form of a long-term loan without interest, made without regard to the credit rating of the insured.
3. A combination of the first two.

Here and There

Federal officials are keeping a wary watch on the housing situation. They wonder if they tightened the credit lid a little too tightly. The Veterans Administration reports requests for appraisal of new homes for GI loans dropped in October for the second straight month. Already there are some indications of more credit for home building. The VA report should add fuel to the fire. A Senate subcommittee will open hearings on housing credit curbs Nov. 28.

The Atomic Energy Commission passed out 97 access permits in October, the largest number in any one month since the permit program began. That brings to 476 the number of permit holders eligible for access to restricted data, subject to security clearance.

E. C. Kreutzberg Dies

EDGAR C. KREUTZBERG, STEEL's Washington editor, died Nov. 13 after a long illness.

He had served this publication 45 years and had written "Windows of Washington" and other Capitol news since 1943.

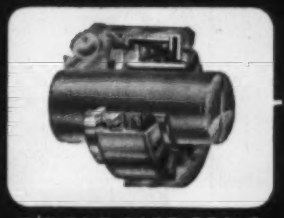
He was born in Milwaukee in 1887, and shortly thereafter his parents moved to Trenton, N. J., where he received his primary schooling. He attended Princeton University, and in 1910 he joined Penton Publishing Co., which is the publisher of STEEL.

Mr. Kreutzberg transferred to the New York office in 1911 where he served in both editorial and business capacities for a time. He returned to Cleveland in 1934 as engineering editor and was appointed editor in 1937.

In 1943 he was named chief of Penton's Washington editorial bureau, representing *Foundry, Machine Design, New Equipment Digest* and *Automation*, as well as this magazine.

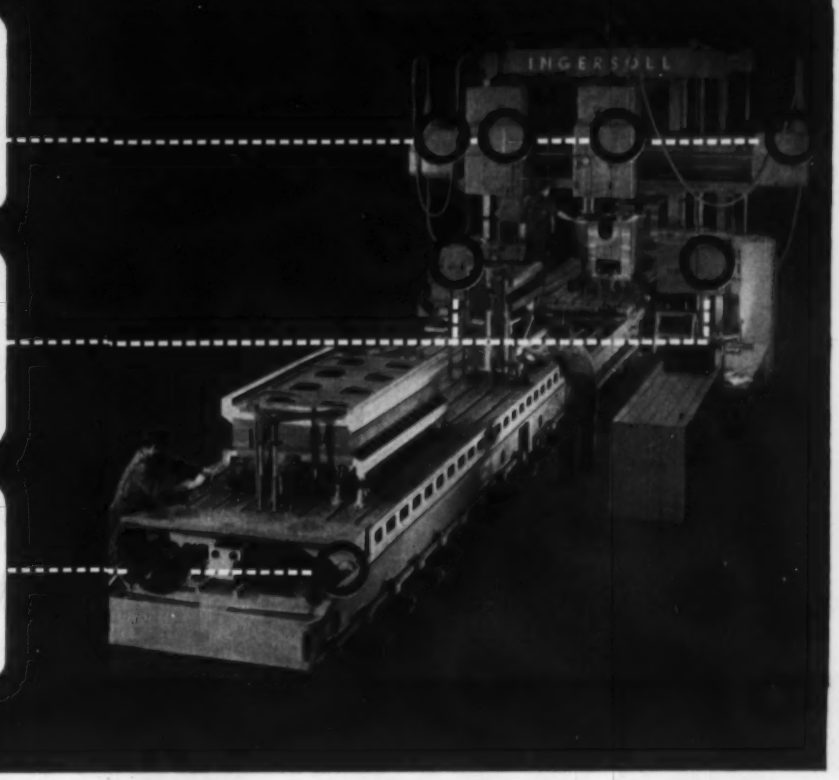
FOR PERFORMANCE PROTECTION

C/R SHAFT SEALS



C/R END FACE SEALS

C/R SIRVENE WAY WIPERS



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C/R SHAFT SEALS deliver outstanding sealing performance and service life on medium speed shafts, gear cases and drive mechanisms. They seal lubricants, exclude chips, coolants, abrasives—and require minimum radial and axial space.

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Cincinnati Filmatic Universal Grinding Machines

It's difficult to improve upon top performance, but it can be done. In toolroom grinding, for example, the new CINCINNATI FILMATIC 12", 14" and 18" Universal Grinders offer three-way improvement:

1—*Improved accuracy.* A new cross feed unit assures closer accuracy than ever before on your precision toolroom work; automatic pickfeed to a positive stop; .000050" minimum increment of adjustment.

2—*Improved convenience of operation.* Table and cross feed handwheels are raised to a more comfortable height. New headstock speed selector is easier to operate. Push buttons are relocated for easier accessibility.

3—*Improved versatility.* Wider selection of quills, spindles and collets for the hinged internal grinding head, a Cincinnati original. Pickfeed at either end or both ends of table cycle. Power rapid positioning (extra) for wheelhead.

These cost-reducing improvements are in addition to other well-known Cincinnati advantages such as FILMATIC grinding wheel spindle bearings. That's why CINCINNATI Universal Grinders are your best buy. Get all the facts by writing for catalog No. G-663.

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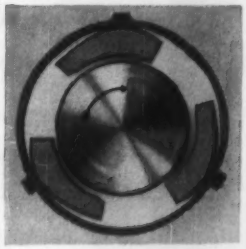
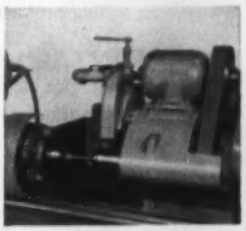
Power rapid positioning . . . eliminates tiresome hand cranking from one diameter to another.



FILMATIC grinding wheel spindle bearings...never wear out, never require adjustment.



Internal grinding head . . . permanently mounted on wheelhead, always ready for the job.

Cross feed unit . . . completely new; two-speed; pickfeed all the way to final size.

Management at Work

GE's Hollomon: Scientist-Salesman

TOP-NOTCH metallurgists are scarce and will become more so. It's highly unlikely that John Herbert Hollomon, 36-year-old manager of General Electric's Metallurgy & Ceramics Research Department will be looking for a different job. If he ever does, he could be a crack candidate for a sales position.

That is the consensus of the 100 young scientists and technicians who work under his direction in GE's new $5-million laboratory. They know because Dr. Hollomon has sold them on the job they are doing and has instilled much of his own enthusiasm in them.

Telescoping—Dr. Hollomon (his bosses call him Herb) is a practical scientist. His aim at the metals and ceramics laboratory is to shorten the gap between the laboratory and the production line.

The new metals and ceramics building is designed for that purpose. Here are found both research facilities and a modern workshop which permits the extension of experimental work to commercial applications. GE scientists find out if a 1-gram sample, made in a test tube, still looks promising in 100-lb or even larger quantities. GE engineers can see, rather than imagine, how a new alloy might perform in their designs.

Doctors in Overalls — Here Ph.Ds happily sweat and toil in overalls to make sure that theory and practice coincide.

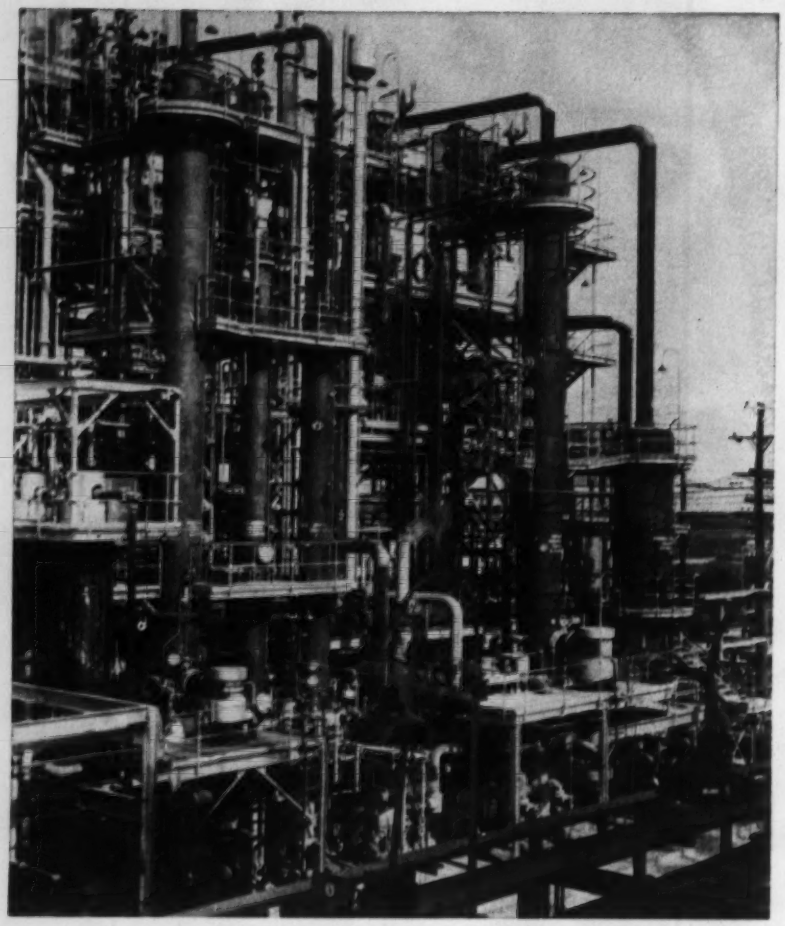
Dr. Hollomon states the objectives of his organization this way:

1. To ascertain and analyze the areas of most critical need for materials and processes.
2. To develop processes for new businesses.
3. To develop materials to improve products.
4. To study materials and obtain a better understanding of their properties and processing.
5. To operate pilot plants and obtain economic data.

In First Ten—Herb Hollomon has a large collection of kudos about which you have to ask his associates. He was picked as one of America's ten outstanding young men by the national Junior Chamber of Commerce in 1954. He also was cited by *Fortune* as one of America's ten leading young scientists. The Army awarded him the Legion of Merit for his work during World War II as chief of physical metallurgy at the Watertown arsenal. As author of some 40 papers in journals of physics and metallurgy as well as a textbook, *Ferrous Metallurgical Design*, he received a number of awards from scientific societies.

His bachelor and doctor of science degrees are from Massachusetts Institute of Technology, and before the war he served on the faculty at Harvard.

His big love is finding better materials and processes for industry.



Du Pont's Victoria, Tex., polychemical refining unit

Chemical Industry Expands

CHEMICAL manufacturers will spend some $1.1 billion on expansion this year.

More than $500 million of that is going into steel construction and equipment, according to the Securities & Exchange Commission. On the basis of the SEC estimate, expenditures will be off a shade from last year and substantially down from the $1.6 billion peak in 1953.

Time Out—The lag is regarded as a breather. Du Pont, for example, expects to increase expansion expenditures next year 15 to 20 per cent, or about $140 million. Its previous top was $135.5 million in 1951, a figure almost equaled by the $135.1 million outlay in 1953.

Five-Year Output — The Manufacturing Chemists' Association, Washington, reports that since World War II, the chemical industry has been among the top three manufacturing industries in expenditures for new construction.

The President's Materials Policy Commission estimated that between 1950 and 1955 projected construction of petrochemical facilities alone would require 784,000 tons of steel, 45,200 tons of ferroalloys, 24,600 tons of cast iron and 9440 tons of nonferrous metals.

King-Sized Business—The chemical and allied products industry is the fourth largest manufacturing group in the country in terms of total assets ($15.8 billion) and at least the fifth largest in terms of annual sales. MCA reports that this year's sales will run close to a record $23 billion, 17.6 per cent up from 1954.

Industry Definition—These sales figures take into account both "chemical and allied products" as the group is defined by the Bureau of Census.

This complex industry splits into three groups: 1. Basic chemicals, such as acids, alkalies, salts and tonnage organic chemicals. 2. Chemical products to be used in further manufacturing, such as synthetic fibers, plastics, solvents, colors and pigments. 3. Finished chemical products like drugs, cosmetics, paints, detergents and fertilizers.

Future Growth — MCA predicts that, in the next decade, the industry will grow three times faster than the all-industry average expansion rate. By 1975, sales of industrial chemicals alone probably will be $25 billion. In 1950, the total was $5.5 billion.

Trend Indicator—The industry's purchases of raw materials are tremendous. In 1953, according to Stanford Research Institute, they were $2.9 billion. Of this amount, $188.6 million went for metals, $418.6 million for coal, coke and coal tars and $71.7 million for metallic minerals. The largest single item was $953.4 million for fats and oils.

Navy Lets New Contracts

Rounding out its shipbuilding program for fiscal 1955, the Navy has awarded a contract for three oceangoing minesweepers to Peterson Builders Inc., a Wisconsin shipyard. The contract price was just under $6 million.

The Navy is starting to let contracts for fiscal 1956. Bath Iron Works will build the first of six frigates, three of which will be equipped for guided missiles. Pentagon reports indicate that a further expansion of the guided missile ship program is planned. A total of nine such ships are on the list handed to budget officers as a basis for the fiscal 1957 budget request.

Cultivation of growth markets pays dividends as . . .

Powder Metals Catch On

POWDER metal producers have the automobile industry to thank for a record year. More than 29,000 tons of their 56,000-ton output will go for auto parts. Last year, shipments were only 36,000 tons.

Even though the auto take may fall off next year, powder people are betting on continued gains. The success of their product and market development programs lends substance to their optimism.

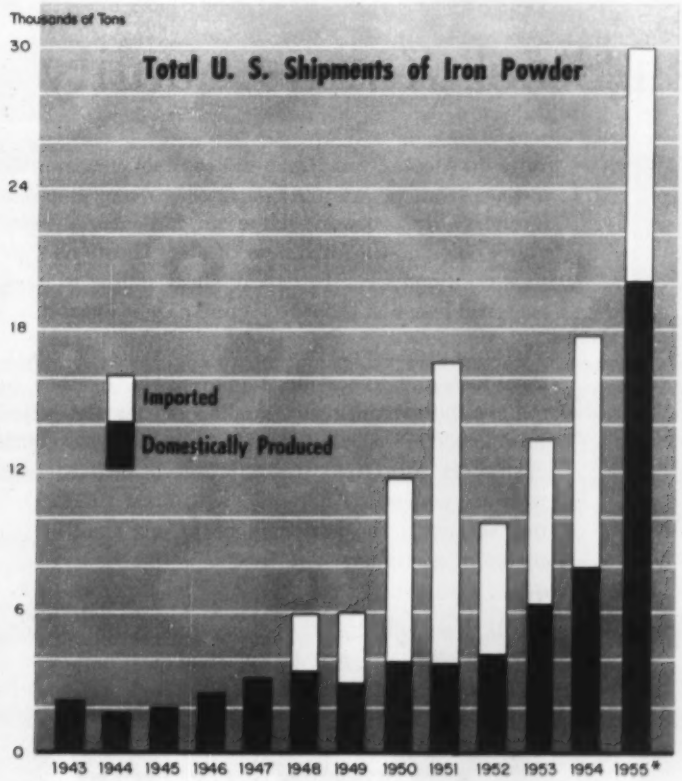
Markets—Powder filters for gasoline were popularized in the auto industry. Now, market emphasis has switched to jet aircraft fuel filters, and to a host of new applications in hydraulic systems (the material does a second-to-none job in keeping delicate servo valves in operation). Applications in business machines and hardware are growing fast. Further gains are expected from iron powder cores for electronic parts.

Breakdown—About 25 domestic producers supply most of the powder used by 100 principal fabricators. Iron powder makers made the most startling gains of the year. From 1949 through 1954, imported iron powder held the lion's share of the American market. This year, domestic producers will supply more than two-thirds of the iron powder consumed—about 20,000 tons valued at better than $4 million.

Copper, lead and alloy powders are making substantial gains. Copper-alloy powder shipments almost doubled from 1954 to 1955, jumping from 4650 to 8200 tons. Bearings and parts take 79 per cent of the copper powder output, friction materials 7 per cent, graphite metal brushes 5 per cent and miscellaneous uses the remaining 9. Lead powder shipments for the year are projected at 3500 tons, highest since 1945 when splatter-type bullets plumped demand.

Trends—To help stimulate new markets, powder producers strive to hold their cost down. At the same time, fabricating tools are improving rapidly. The results: New applications are opening up fast, not only in mass-produced complex parts where powder metallurgy is the ideal solution for production problems but also in special machinery, where runs can be relatively short. Recent gains in the textile equipment market afford a good example. One important equipment trend is toward multiple-motion presses that can churn out parts to close tolerance, but which can still be changed over at minimum expense.

The powder metallurgy outlook is bright. Nuclear power reactor parts and other atomic energy fields promise substantial new markets. Zirconium, beryllium and other alloy powders will play an important part in solving their special problems.



*Estimated
Source: Metal Powder Association

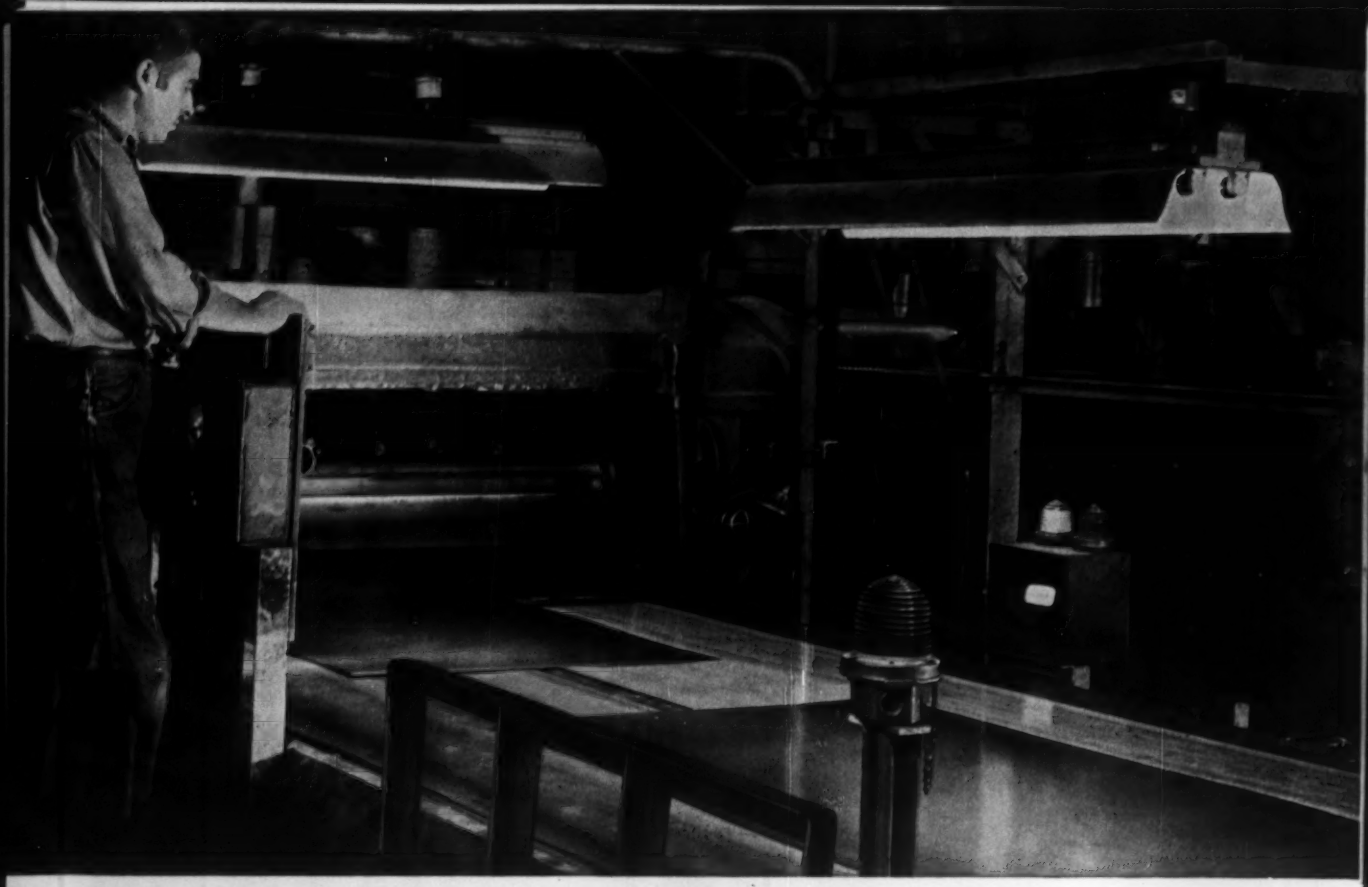
New Boat Breaks Tradition

A 90-ft twin-screw towboat the Dravo Corp. is building in its Wilmington, Del., shipyard will start push-towing of barges on east coast waterways next year.

On the Ohio and the Mississippi, towboats have pushed barges for over 100 years. But, traditionally, barges are towed behind or alongside the power vessel on east coast waterways.

The new towboat combines the features of river towboats with those of harbor tugs. It will push two 20,000-barrel tank barges along a 90-mile route from Piney Point, Md., to Washington.

Steuart Transportation Co., a newly formed subsidiary of Steuart Petroleum Co., Washington, will use the boat to move petroleum from its tank farm to distribution terminals.



How Great Lakes Steel *X-rays* quality

Above: Stacking sheets after the X-ray check. *Below:* With dozens of tests passed and uniformity assured, the flat-rolled steel is O.K.'d for wrapping and delivery.

Why do sheets from Great Lakes Steel consistently meet customers' specifications? The X-ray machine is one of the answers. Here an indicator (shown above) signals the thickness of steel sheets as they pass on a conveyor belt. Any sheet failing to meet the established standard is immediately ejected.

Throughout the Great Lakes mills, modern machines and experienced men work together to maintain the consistent quality of our flat-rolled products. Our service includes close contact with customers by Great Lakes representatives, men who are concerned not only with steel production but also with the performance of our steel in the plants of customers.

The next time you have a problem in steel, give us a call. You will find that both quality and service are *consistent* at Great Lakes Steel.

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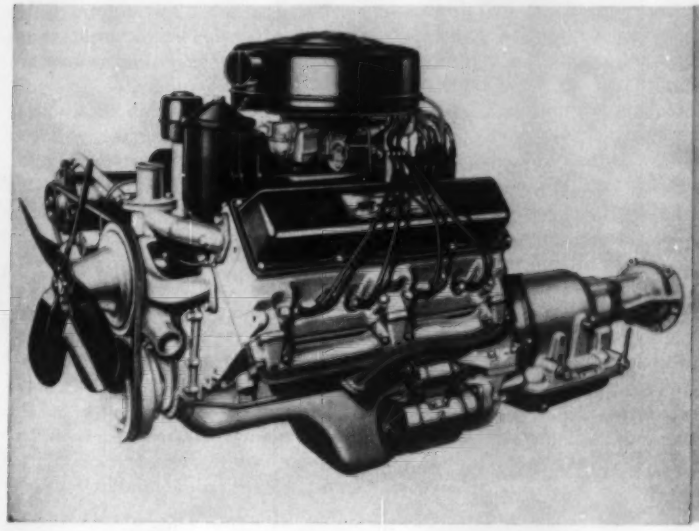

What's Coming in Engines?

Fuel injection?

Diecast blocks?

500 horsepower?

Higher compression ratios?

Bigger displacements?

Reciprocating units will hit 500 hp in . . .

Evolution in Engines

IF YOU'RE one of those people worried about where the horsepower race is going to end, pity the poor engine designer whose living depends on the answer to the same question.

Step Up — Average maximum horsepower figures for the various makes in the industry put the 1953 average at 133 hp. In 1954, it jumped to 160; in 1955, to 200; and this year it will be about 240. Contrast this with the 235 hp which netted Chrysler the 1954 horsepower crown, and you can see the scope of the uppage. Cadillac Motors announced 230 hp in 1954, and just two years later is offering 305 hp in its power-package jobs.

The proportional gains are quite substantial enough to be conjured with in the various dynamometer labs around town, as well as in the ad agencies. Where the present rate of increase (30 to 40 hp annually) is leading is a question vital to the automakers in an extremely unacademic way.

Pressure—Two factors heighten the problem. The first is the imminence of the turbine; its coming now seems largely a matter of competitive pressure. Major fabrication bugbears are melting rapidly, with the latest word on the subject indicating that Ford is pretty well settled on shell-molded blades of a ferritic alloy. Chrysler has made "extremely satisfactory progress" in the last year. And General Motors sees no insurmountable barriers. Studebaker-Packard also seems ready, and the first company to break will find the rest right on its heels, though all will continue to refine their designs.

The second factor important in the future of reciprocating engines is the fact that most automakers are presently running out of engine. One engine introduced in 1955 was facelifted during the design period and introduced with the knowledge that it was only about 50 hp under its intended maximum. Engines already on the market have only a year or two to go before really major changes will be necessary.

Consolation—Comforting is the fact that reciprocating engines won't be dropped overnight when the turbine arrives, which indicates that expenditures in research and manufacturing will continue to pay off. All of which gets back to the original question of where the horsepower race is going to end.

Best guesses right now are that the horsepower race will end at 500 hp. There are plenty of factors that indicate this ceiling, but the major one is the limit of tire adhesion to the pavement during acceleration. With 500 hp advertised, or a net of about 375 hp to the rear wheels, it is possible to spin the wheels on dry pavement at any speed up to 60 mph, and that's the basis one automaker is using in laying out his new engine.

Considerations — Tire adhesion could be improved, of course, but there are other reasons for putting the limit there. A major one is the space available between the front wheels for the engine. Allison produced an engine rated at 1710 hp for aircraft, but it would pretty well fill the passenger space of a conventional car. Assuming

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the space to be fixed, 500 hp is about tops for an engine to fill the cavity.

Such an engine, however, will be quite a frameful. Displacement of one engine now on the drawing boards will be adjustable up to 450 cu in., and most engineers figure that will be about the maximum for the V-8 type. If that seems incredibly big to you in terms of 300 cu in. being a big engine until recently, Lincoln this year provides 368 cu in. for explosions to dissipate themselves.

Meaning—Making an engine that big does have plenty of implications for metalworking men. Now getting under way is a round of new tooling to increase engine displacements. And those tooling demands will rise still more during the next two years. Machine tool builders particularly will find demand for new equipment to replace tools usable only on smaller blocks, heads, etc. While some machines are adaptable to larger parts, fixed spindles and work clearance items must be discarded as automakers continue to up their horsepower.

Included in the same package will be modernization of engine plants, some of which were the latest thing only two or three years ago, to take advantage of further developments in automation. And one major automaker presently building separate engines for each of three divisions is considering a new engine plant to build one basic engine for all three, with the objective of greater volume and interchangeability of parts. Important changes for easier manufacture also are in the offing as retooling takes place.

Aluminum Block?—Another factor of fundamental importance to metalworking men is the possibility of die-cast aluminum engine blocks. One factor, of course, is the weight consideration in engines of the size contemplated. Already noseheavy to an embarrassing degree, the car of tomorrow could have the directional persistence of an arrow with that mass of weight in the front.

But while handling engineers drool over die-cast blocks from the weight distribution standpoint, the manufacturing people contemplate fabrication short cuts possible through the technique. Examples of machining reductions up to ten times in some transmission parts through diecasting quite naturally lead them to consider ever more closely the possibility of similar economies in vast engine machining setups of today. Even with the contemplated wet sleeve design, diecasters and aluminum people working with the automakers figure the savings would be considerable.

Timetable—Best guesses now are that die-cast aluminum engines will begin to appear on the road within the next two to four years, following the immediate round of displacement increases. The impact on aluminum consumption will undoubtedly be considerable, and automaker expansion in the die-casting field could well have greater impact than on the machine tool business.

Plenty of other things will have to be done to get the expected 500 hp from the reciprocating engine of tomorrow, however. Much touted fuel injection must compete with a four-barreled carburetor that costs only about $15 today. Offering advantages in better mixture control and fuel distribution, the cost barrier still looms all important in whether it will be adopted.

Injection — Research presently centered on injection into the intake manifold rather than into the cylinder holds promise that the cost barrier can be overcome. Fairly narrow torque characteristics associated with the Hilborne system also are reportedly being surmounted, and it seems likely that the system will become optional equipment within the next year. Packard looks like a good bet to launch it as another industry "first."

Its role in the move to 500 hp will be to lower octane requirements (about 5 to 10 numbers), increasing power perhaps 20 per cent and economy about 10 per cent. Others may well be forced to offer it to overcome deficiencies in the displacement race, however, and it will gradually creep down the standard equipment roster.

Evolution—Other components of the car will require substantial modification to handle the increased engine output, particularly in the drive train. And transmissions will be given still more impressive performance characteristics, so that the net effect on 0 to 60 mph times will be something to behold.

Already a step in that direction is the new three-speed automatic transmission in the works at Chrysler's Kokomo, Ind., plant now abuilding.

Perhaps the most amusing thing in the whole picture, believe it or not, is a general belief that horsepower is to be de-emphasized in the years ahead. Some cite the Continental as indicative of the trend and report that torque is on the upswing as a performance peg for the layman, just as it has been to the engineer for some time. Oldsmobile announces the "T-350" this year in a reference to torque. Lincoln makes no secret of a most remarkable 401 foot-pound rating on its engine for 1956; and Ford has continued the "trigger-torque" motif started last year with the 1955 models.

But whether horsepower is de-emphasized, it's a safe bet that it will continue to increase at the rate it has in the past for at least the next four or five years. At the present rate of increase, that also checks out at 500 hp. Now all we need are traffic lights with green, yellow and a checkered flag.

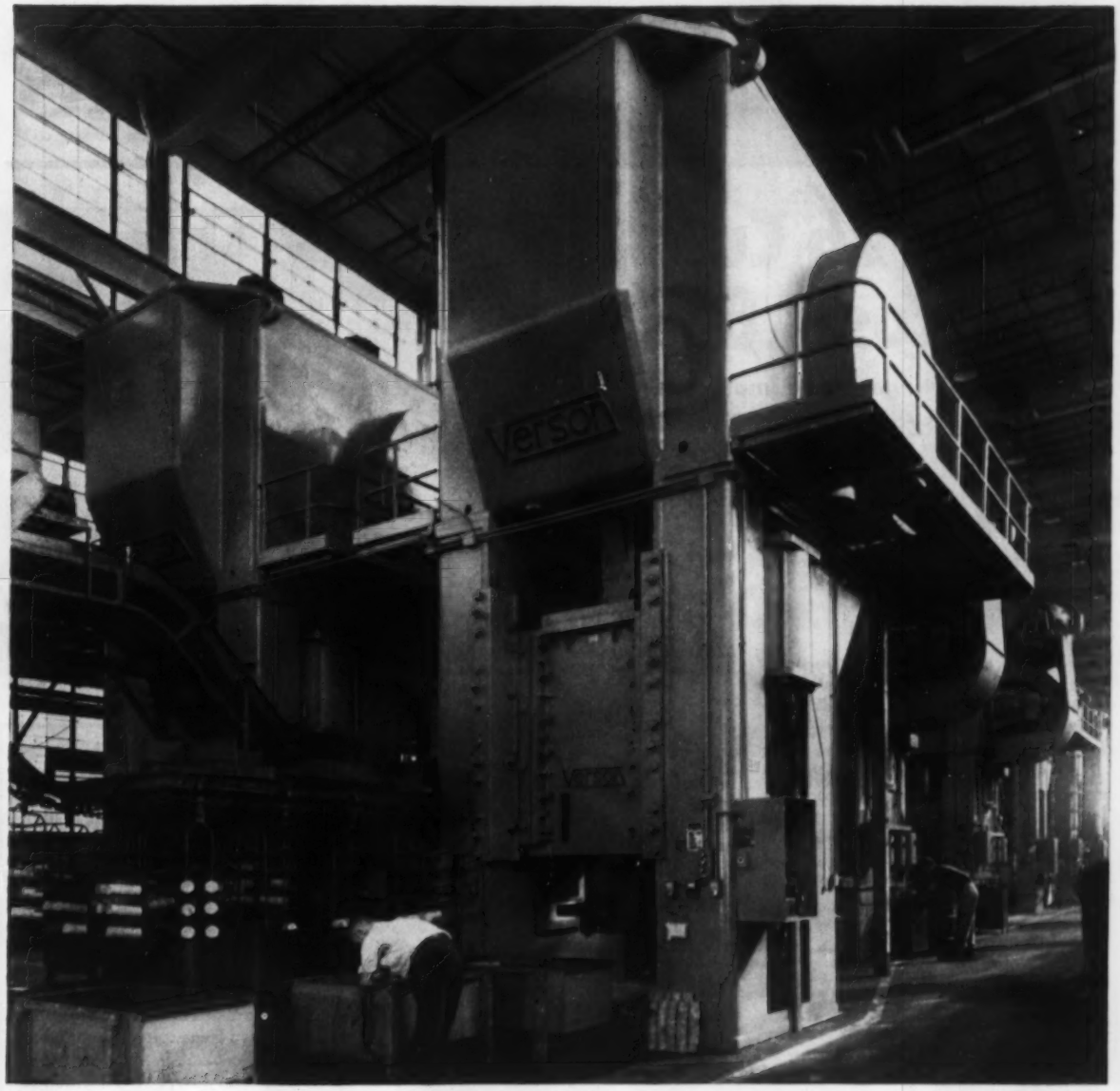
U. S. Auto Output

Passenger Only

	1955	1954
January	659,719	456,765
February	675,769	443,257
March	794,188	526,076
April	754,007	533,470
May	724,891	494,250
June	649,372	504,811
July	659,979	441,451
August	614,392	436,650
September	461,592	285,860
October	517,696†	236,635
November		508,466
December		641,971
Total		5,518,662

Week Ended	1955	1954
Oct. 15	101,581	44,882
Oct. 22	137,425	45,649
Oct. 29	158,430	68,649
Nov. 5	162,278	92,766
Nov. 12	181,400†	116,285
Nov. 19	184,000*	133,917

†Preliminary *Estimated by STEEL
Source: *Ward's Automotive Reports*



-Verson-

ECCENTRIC PRESSES head the line at Heintz Manufacturing Company

● The two Verson Eccentric Presses illustrated above are each rated at 1500 tons with 4500 tons drive capacity. The presses are a key part of the cold extrusion lines at Heintz Manufacturing Company, Philadelphia, said by many to be "the birthplace of cold extrusion of steel in America." Both presses are specially designed with fast operating speeds to fit the production process.

Like all Verson Eccentric Presses, these represent the ultimate in mechanical press design. They provide power, strength, resistance to deflection, accuracy and efficiency unmatched by any other mechanical presses. This design coupled with Verson production know how means that when you select a Verson press, you get more than just a press. You get a production tool, tailored to your requirements as an integrated part of your production process.

It will pay you to take advantage of Verson experience in the expansion or modernization of your facilities. With a long list of advancements to its credit, Verson may be able to show you the way to lower unit production costs. For specific recommendations, send an outline of your requirements.

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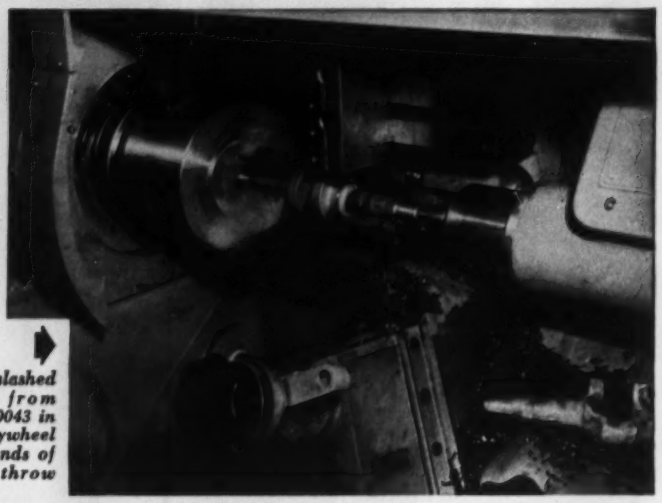
carbide NEWS

Grade 26 Cuts Tool Costs 88%

New wide range grade and holder boost pieces/grind from 85 to 800

A reduction from approximately four cents to less than ½ cent per piece in tool cost has been achieved in the machining of single-throw Arma Steel crankshafts by a midwestern machine company. These savings were obtained despite an increase in blade cost of 41% over the style previously used.

The savings were achieved in two steps. The first revealed that Wessonmetal Grade 26 would out-perform all other grades by an average of 50 pieces per cutting edge. The next step was to adopt a Wesson Multicut holder. This helped to increase tool life to 200 pieces per cutting edge. With four edges per insert, life is 800 pieces per grind, as against the original 85. Part of the overall increase is due of course to the rigid construction and support provided by the new holders.



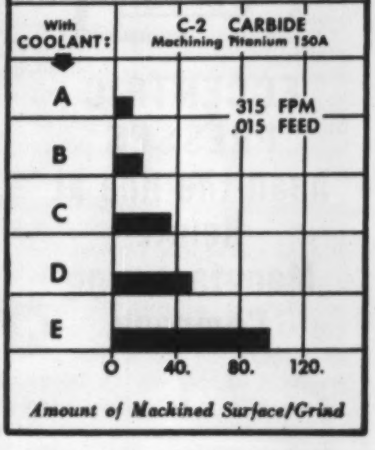
26 Carbide slashed tool cost from $0.038 to $0.0043 in machining flywheel and pulley ends of this single throw crankshaft.

Operations consist of rough and finish turning of the flywheel and pulley ends of the 220 Brinell steel crankshaft. Machining is being done dry on a 20 hp New Britain tracer lathe at 1210 rpm and .014" feed. Depth of cut averages ¼ to ⅜-inch.

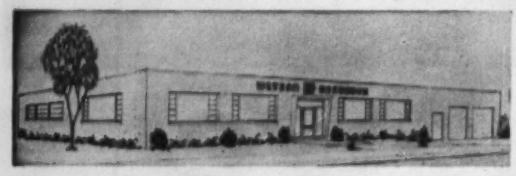
In achieving the savings, no changes were made in speeds, feeds or depths of cut.

Tool Hints...

The cost-cutting story told above re-emphasizes the necessity of studying ALL the factors contributing to tool performance if maximum economies are to be obtained. In this case, the answers lay in (a) the carbide metal and (b) the tool holder. Sometimes it may be the coolant which will provide a major saving. In the chart below, for instance, are shown relative lives of the same tool material at the same speeds and feeds using five different types of coolant in the machining of Titanium 150A! A C-2 grade of carbide was used and feed was .015" at 315 ft. per minute.



New Carbide Research Center



New concepts in carbide boring and milling cutter designs may result from new research programs now under way at Wesson. Included are milling cutters utilizing "throwaway" carbide blades.

To house Wesson's expanded product development and tool application research facilities and staff, a new one-story structure has been completed adjacent to Wesson's Detroit plant.

The new research division will supplement the basic metals research carried on in Lexington, Kentucky at the new metals plant of the Wesson Metal Corporation, now producing all Wessonmetal carbides.

The new research division is under W. B. Bader, Vice President. It is being completely equipped for fabrication as well as testing of new tool designs. Lathes, milling machines, grinders, etc., are included in the equipment.

tools Wesson carbide Wessonmetal

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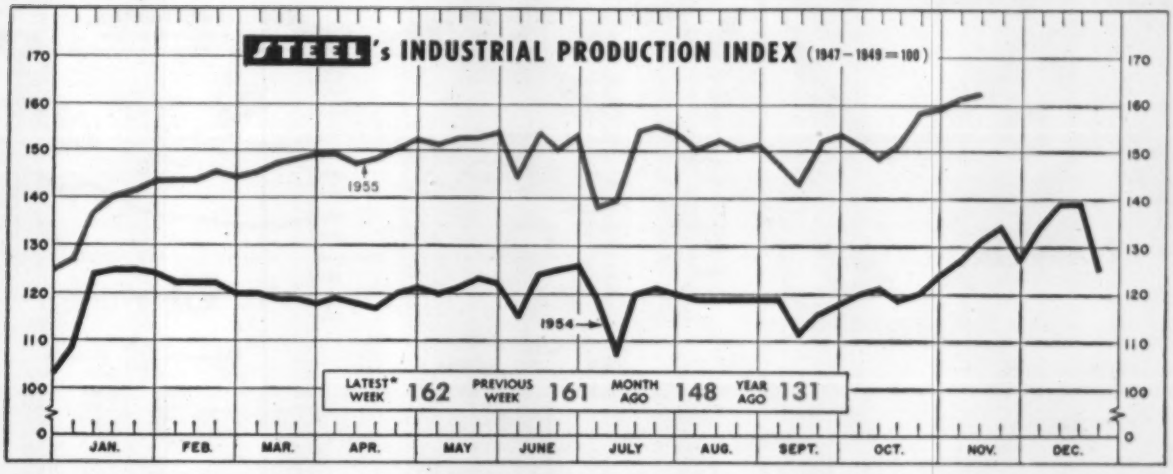
Detroit 20, Michigan



*Week ended Nov. 12. Based upon and weighted as follows: Steel Output, 35%; Electric Power Output, 32%; Freight Car Loadings, 22%; and Auto Assemblies, 11%

Sales Pace Inventories in Last Quarter

BUSINESS INVENTORIES are heading upward.

It's a good sign generally, not like back in 1953 when top-heavy inventories were a big factor in starting the 1954 decline.

Contrast—There are important differences in the 1955 picture: 1. Sales are pushing ahead strongly, outpacing the inventory build-up in many cases. A hearty indication they will continue on the upward slant for months to come is a swelling tide of new orders.

Looking back at the 1953-54 period when total inventories slumped $3 to 4 billion, Labor department reports show that sales were dropping about the same amount. New orders dropped even more.

Christmas Rush — Inventories usually rise toward the end of the year. Trade manufacturers are stocking up for the seasonal push. It's likely there will be some drop after January.

The big change is in manufacturing. Sales are above $27 billion a month. At this time in 1954 and 1953, monthly sales were under $25 billion.

New orders are running at over $28 billion a month, compared with $25 billion in 1954 (when the business pickup began) and $22 billion monthly in 1953.

Manufacturers' inventories, which are about $45 billion now, were $44 billion in 1954. In 1953, inventories were high at $46.5 billion.

An inventory rise at this time shows confidence of buyers and manufacturers alike. It's a good indication of the over-all healthy state of business.

In Steel—An example of the inventory situation is steel. In September (latest figures), steelmakers added 303,977 net tons to their stocks. That's about one day's usage. A year ago in September, they were withdrawing from inventory—to the tune of 1.1 million tons.

Employment is going along with rising inventories, a sign that

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,384[1]	2,404	1,892
Electric Power Distributed (million kw-hr)	10,760[1]	10,853	9,357
Bitum. Coal Output (1000 tons)	10,100	9,760	8,597
Petroleum Production (daily avg—1000 bbl)	6,770[1]	6,777	6,191
Construction Volume (*ENR*—millions)	$267.9	$394.0	$371.5
Auto, Truck Output, U. S., Canada (*Ward's*)	215,609[1]	199,950	141,606
TRADE			
Freight Car Loadings (1000 cars)	820[1]	809	686
Business Failures (Dun & Bradstreet, no.)	226[1]	237	204
Currency in Circulation (millions)[3]	$30,657	$30,528	$30,278
Dept. Store Sales (changes from year ago)[4]	+1%	+8%	+4%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$18,272	$22,498	$19,959
Federal Gross Debt (billions)	$279,751	$279,826	$278,721
Bond Volume, NYSE (millions)	$15,931	$17,019	$25,004
Stocks Sales, NYSE (thousands of shares)	9,351	9,695	16,157
Loans and Investments (billions)[4]	$85,623	$85,571	$84,932
U. S. Govt. Obligations Held (billions)[4]	$30,559	$30,922	$37,358
PRICES			
STEEL's Finished Steel Price Index[5]	208.90	208.90	194.53
STEEL's Nonferrous Metal Price Index[6]	264.0	264.4	217.2
All Commodities[7]	111.0	111.1	109.7
Commodities Other than Farm & Foods[7]	118.7	118.7	114.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278; 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

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- "Tremendous time and labor saver . . . time saved, 75% labor saved, 81%"
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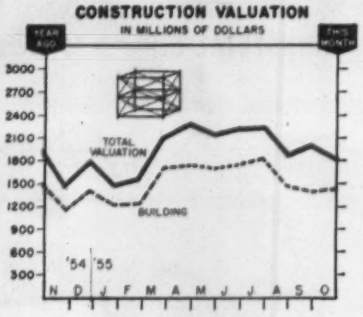
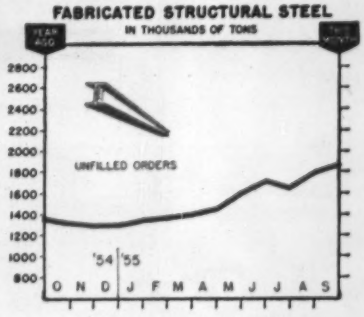
THE BUSINESS TREND





37 States

	Total		Building	
	1955	1954	1955	1954
Jan.	1,504.5	1,151.9	1,255.1	935.6
Feb.	1,581.1	1,221.3	1,278.6	977.5
Mar.	2,134.8	1,527.5	1,748.6	1,199.8
Apr.	2,322.1	1,691.9	1,776.1	1,401.6
May	2,185.1	1,925.3	1,737.1	1,497.6
June	2,255.2	1,733.3	1,793.7	1,376.7
July	2,271.5	1,836.9	1,851.6	1,386.9
Aug.	1,894.8	1,572.9	1,516.9	1,243.3
Sept.	2,034.9	1,816.2	1,442.2	1,424.2
Oct.	1,862.7	1,965.3	1,474.8	1,522.8
Nov.	.....	1,498.9	.....	1,199.8
Dec.	.....	1,828.8	.....	1,463.0
Total	.....	19,770.2	.....	15,628.8

F. W. Dodge Corp.

	Shipments		Backlogs	
	1955	1954	1955	1954
Jan.	225.8	245.6	1,346	1,686
Feb.	213.4	253.1	1,360	1,697
Mar.	227.8	285.4	1,392	1,645
Apr.	239.7	293.5	1,444	1,566
May	223.2	253.9	1,592	1,490
June	282.3	290.3	1,706	1,391
July	219.4	265.2	1,639	1,429
Aug.	266.7	272.5	1,776	1,270
Sept.	289.1	265.4	1,854	1,329
Oct.	....	258.4	....	1,294
Nov.	....	228.7	....	1,280
Dec.	....	223.5	....	1,281
Total	....	3,135.5		

American Institute of Steel Construction

Charts copyrighted, 1955, STEEL

manufacturers expect the next quarter to be good.

Steel industry employment increased in September for the ninth straight month, reports the American Iron & Steel Institute, New York. The September total was estimated at 680,200, compared with 679,900 in August and 597,400 in September a year ago.

Iron and steel wages for September totaled $302.8 million. That averages out at $2.60 per hour for each worker. Wages and employment should stay at least as high, possibly higher with the increasing demand for steel.

Employment Keeps Rolling . . .

Total U. S. employment rose to a record 65.2 million in October, say the Commerce and Labor departments. That's 400,000 higher than September and a good 3 million more than a year ago.

Unemployment holds steady and probably will continue to do so until after the holidays when it will rise some. Although the number of unemployed usually drops in October, this year the increase of housewives and other casual workers seeking work in this high prosperity era keeps unemployment levels relatively unchanged.

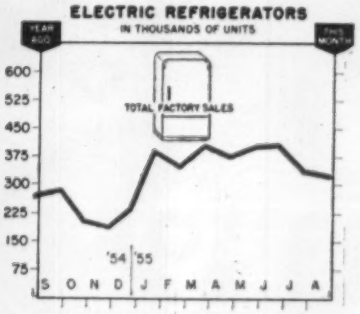
The Commerce department reports personal income pushed to an annual rate of $307.5 billion, $2.2 billion above its previous record pace of July and August. Income is nearly $20 billion (annual rate) higher than it was during September, 1954. It looks like this pace will continue as employment keeps its steady gains to pace the business glow.

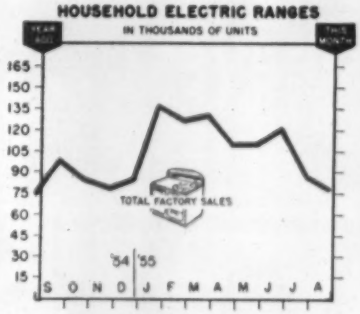
Electric Power Lights Up . . .

Another good indicator of an optimistic fuhture are the electric power industry's plans to spend $2.8 billion for expansion in 1956. Power production is closely attuned to national business climate.

The U. S. Chamber of Commerce asserts: "Current business expansion is geared to peacetime production, not war spending. Business is gaining faith that it can do for itself. More than any time since 1929, private enterprise is finding itself."

And even though building credit curbs are still tight, the Commerce and Labor departments believe that construction spending in 1956 may reach a record $44 billion, a 5 per cent gain over this year's estimated $42-billion peak.





Total Factory Sales—Units

	1955	1954	1953
Jan.	381,197	344,401	325,186
Feb.	338,575	334,122	377,605
Mar.	392,774	330,641	368,498
Apr.	364,298	280,900	366,951
May	390,385	282,164	317,667
June	395,936	303,127	343,114
July	323,240	325,061	298,838
Aug.	310,789	256,665	232,981
Sept.	.....	271,859	231,224
Oct.	.....	190,753	179,749
Nov.	.....	175,557	139,563
Dec.	.....	228,612	197,102
Total	.....	3,323,562	3,378,478

National Electrical Mfrs. Assn.

Total Factory Sales—Units

	1955	1954	1953
Jan.	136,663	101,870	88,145
Feb.	127,188	109,647	114,465
Mar.	130,180	115,393	130,788
Apr.	108,619	92,751	118,999
May	109,263	82,649	114,404
June	120,100	85,854	113,086
July	85,659	80,017	77,836
Aug.	76,158	75,907	74,326
Sept.	.....	99,611	84,481
Oct.	.....	84,321	73,422
Nov.	.....	79,340	55,748
Dec.	.....	85,033	73,870
Total	.....	1,092,393	1,119,570

National Electrical Mfrs. Assn.

Albert M. Cole, Housing & Home Finance administrator, says: "Enough mortgage money will be available in 1956 to support 1.2 million housing starts"—the level the Eisenhower administration would like to see in this election year. That's 100,000 down from this year and 200,000 less than the 1950 peak.

Builders Smile . . .

Some of the forecast highlights reveal that private construction outlays in 1956 are expected to rise about 3 per cent above the 1955 expected total of $30 billion. Public construction will likely top $13 billion, up 10 per cent from this year's spending level. Private residential building (nonfarm) will remain near or slightly below this year's $16 billion level.

More Money for Maintenance...

Indicative of the feeling on the part of many businessmen that 1956 will continue good comes word that many companies are putting more dollars into maintenance and repair work to keep hard-driving machines on the go.

Allis-Chalmers Mfg. Co., Milwaukee, states that it has put about $2 million of its profits into plant maintenance and equipment; this in addition to regularly planned expansion of both its tractor and industrial groups.

George W. Kennedy, president of Kelsey-Hayes Wheel Co., Detroit, maker of wheels, brakes and other automotive parts, reveals: "We have expended approximately $5.5 million during the year for property, plant and equipment. Kelsey-Hayes figures similar expenditures in 1956 will about equal this year's.

Trends Fore and Aft . . .

Chrysler Corp. reports orders for 1956 "Flight-Sweep" models have been so high the company's plants are scheduled to ship more than 425,000 cars during the last quarter of this year. This compares with 297,986 cars shipped in the final quarter of 1954 . . . Dwight P. Joyce, president of Glidden Co., Cleveland, says the company's plant expenditures in 1956 will exceed $13 million. This includes an $8-million Baltimore, Md., plant to increase output of titanium dioxide. Mr. Joyce also revealed that Glidden's research and development budget is some 20 per cent higher than it was last year.

• Edited by GEORGE BLACK

CASTING INSTRUMENT HOUSING

Maintaining close dimensional accuracy, fine surface finish and uniform soundness in casting a 1¼ lb. stainless steel instrument housing demanded design conferences with the customer, "tailored" pattern equipment, hand rammed hollow shell cores, closely controlled pouring range, Shellcast® know-how and special handling from shakeout to shipment. For the full story of how this "impossible" casting is cast on the production line, ask for Cooper Alloy AKH (Advanced Know-How) Study #3.

HAIR SETTING STORY

Quikupl® fittings used in an alcohol line for the passage of liquid hair spray net have put an end to leaking connections and enabled rapid disassembly for cleaning purposes. If you're looking for a stainless steel fitting which can be put together in a jiffy without welding, threading or flaring, get the facts on Quikupl. Ask for Bulletin Q100.

PUMPING FERRIC CHLORIDE

Electronic manufacturers have found the answer to the problem of pumping the ferric chloride needed by their Printed Circuit Departments. The Vanton "flex-i-liner" with Buna N body block and Natural Rubber flexible liner is perfect. Since it operates equally well in either direction, a simple reversing switch on the motor provides for quick change in direction of flow. Catalog VP55 has the facts.

NEW DISTRIBUTOR FOR COOPER ALLOY

Effective September 15th, Western Alloys & Metals Limited became authorized distributors for Cooper Alloy stainless steel valves, fittings and accessories. They will serve the three western Provinces of Canada: British Columbia, Alberta, and Saskatchewan.

Heppenstall's custom-built back-up roll sleeves . . .

. . . work to your over-all cost advantage

Heppenstall Back-Up Roll Sleeves enable you to roll record tonnages . . . decrease downtime . . . and effect over-all cost reduction. They give longer working life in today's high-speed mills because their up-to-the-minute design permits utilization of more effective forging and heat treating operations in their production. Each sleeve's working surface is *tempered to meet your exact hardness specification.*

These mandrel-forged sleeves—made from highest quality Heppenstall-produced alloy steel—are worked thoroughly under modern hydraulic presses to produce a finished product having both maximum density and grain refinement. In addition, they offer you exactness of fit and greater resistance to cracking and spalling during high-speed rolling.

All Heppenstall sleeves are fitted to extremely close tolerances which prevent circumferential slippage. Longitudinal movement is also eliminated because they are further locked in place by both a shoulder and Heppenstall's own patented locking ring.

Heppenstall also produces forged arbors . . . has facilities to grind both arbors and sleeves for perfect shrink-fitting.

For additional information and technical assistance, contact Heppenstall Co., Pittsburgh 1, Pennsylvania. Sales offices are located in principal cities.

Heppenstall

The most dependable name in forgings

ARNOLD W. HARTIG
. . . Detroit Universal plant mgr.

Arnold W. Hartig was made plant manager and **Arthur M. Swigert** works manager of the newly acquired **Detroit Universal Division** of Chrysler Corp., which includes the plants, equipment and inventories of Universal Products Co. and its subsidiary, Formetal Co. Mr. Hartig served as treasurer and director of Universal Products. Mr. Swigert was vice president-manufacturing.

Kent R. Manning was made general manager and **Dan Ruple** production control manager of the Jackson, Mich., division of **Aeroquip Corp.** **George Lagassa,** former Aeroquip production control manager, was made plant manager of Elbeeco Inc., a subsidiary.

James R. Ewing, former assistant sales manager of Motor Products Corp., joined **Mechanical Handling Systems Inc.,** Detroit, as general sales manager.

Niagara Machine & Tool Works, Buffalo, elected **George E. Munschauer** chairman and chief executive officer; **Frederick E. Munschauer Jr.,** president and general manager; **Franklin A. Reed,** vice president-sales; and **Edwin A. Munschauer Jr.,** treasurer.

Olin D. Blessing, sales manager, was made a vice president of **Dow Corning Corp.,** Midland, Mich.

GEORGE F. MEYER
. . . Warner & Swasey gen. supt.

George F. Meyer was named general superintendent of **Warner & Swasey Co.,** Cleveland. He had been first-shift superintendent at the Cleveland plant since 1953 and was given additional duties as maintenance superintendent in September of this year.

Kaiser Aluminum & Chemical Corp. appointed **John W. Bizot** chief metallurgist at its Permanente, Calif., foil mill. **Conrad O. Curell** was made chief development engineer at Chicago.

William W. Ogren was made general sales manager, **Penco Metals Products Division,** Alan Wood Steel Co., Pittsburgh.

Donald R. Helson was made assistant sales manager of **Huck Mfg. Co.,** Detroit.

Sherwood G. Burnett was made manager, process equipment section, equipment division, **National Research Corp.,** Newton, Mass. He is succeeded by **T. E. Burleigh Jr.** as New England district manager of Naresco Equipment Corp., sales subsidiary.

J. P. Caulfield was made assistant to F. R. Milliken, vice president of **Kennecott Copper Corp.,** in New York. He is succeeded by **C. D. Michaelson** as general manager, Western Mining Divisions, Salt Lake City, Utah.

JOHN M. ANSPACH
. . . De Laval foundry-pattern shop mgr.

John M. Anspach was appointed manager of the foundry and pattern shop of **De Laval Steam Turbine Co.,** Trenton, N. J. He was service engineer with Meehanite Metal Corp.

Chester G. Hawley was made general sales manager, industrial division, **Jeffrey Mfg. Co.,** Columbus, O. He succeeds the late **Lincoln Kilbourne.**

Robert S. Hood was named vice president-manufacturing at **Gertsch Products Inc.,** Los Angeles.

Norman E. Carlson was made director of engineering for **American Car & Foundry Division,** ACF Industries Inc. He continues as works manager of the St. Charles, Mo., plant, in addition to his new duties.

William K. Downey was named vice president-sales of **Skil Corp.,** Chicago. He succeeds **Paul Watts,** transferred to San Francisco as branch manager.

Thomas A. Jermyn Jr. was made chief engineer and assistant superintendent of **Kerr-Lakeside Industries Inc.,** Euclid, O.

W. Raymond Myers was promoted to assistant sales manager, metal products division, **Goodyear Tire & Rubber Co.,** Akron. **Charles D.**

JACK J. CARLSON
. . . Kaiser Steel appointment

PARK Q. WRAY JR.
. . . heads National Motor Bearing sales

MALCOLM ANDERSON
. . . Gibson Electric sales manager

Thompson was made assistant manager, metal products original equipment sales.

Jack J. Carlson was appointed a vice president of **Kaiser Steel Corp.** and general manager of its Montebello, Calif., fabricating division plant. **B. J. Osborne,** former general manager, moves to the Oakland, Calif., home offices of the company as assistant to the vice president and general manager for consultation for fabricating division operations.

Ra-Vac Inc., High Bridge, N. J., successor to Industrial Radiant Heat Corp., appointed **Henry Thompson** sales manager.

Richard Sampson was made purchasing agent of **Rigidized Metals Corp.,** Buffalo.

A. I. Aalto was named manager of plant facilities of **Alco Products Inc.,** Schenectady, N. Y. He succeeds the late **J. E. Currie.**

Park Q. Wray Jr. was made general sales manager, **National Motor Bearing Co. Inc.,** Redwood City, Calif. He was sales manager of the replacement division.

George A. Jedenoff was made assistant general superintendent at the Pittsburg, Calif., works of **Columbia-Geneva Steel Division,** U. S. Steel Corp. He succeeds **Robert B. Freeman,** now assistant general superintendent of U. S. Steel's Gary, Ind., sheet and tin mill. **J. P. Newman** replaces Mr. Jedenoff as superintendent - cold reduction. **Leonard Tofft** was made division superintendent-blast furnaces at the Geneva, Utah, works of Columbia-Geneva Steel, succeeding the late **Harold B. Makin.**

Malcolm Anderson was made sales manager, **Gibson Electric Co.,** Pittsburgh. He was an independent manufacturers' representative in Minneapolis, handling metallurgical and electronic products.

Harold Etherington and **William Jackel** were made vice presidents of Nuclear Energy Products Division, **ACF Industries Inc.,** New York. **James C. Stowers** was named assistant to the president of the division. Mr. Jackel remains at Albuquerque, N. Mex., where he is manager of company operations.

Francis J. Duffy was elected president of **La Crosse Trailer Corp.,** La Crosse, Wis. He succeeds **W. F. Funk,** president and chairman, who announces his semiretirement after 64 years with the firm. He remains chairman.

Elmer F. Twyman, vice president-general manager, Yale Materials Handling Division, Philadelphia, **Yale & Towne Mfg. Co.,** now is located at executive offices in New York to co-ordinate all domestic materials handling operations. He is replaced at Philadelphia by **John A. Baldinger,** former general manager, Automatic Transportation Co. Division, Chicago. **Roy L. Wolter,** former midwest regional sales manager of Yale industrial trucks, succeeds Mr. Baldinger.

George R. Brown is manager of **General Electric Co.'s** metal rolling and processing systems sales unit, systems sales section, Schenectady, N. Y.

Robert E. Hunter was made general sales manager, **Detroit Diesel Engine Division,** General Motors Corp., Detroit. He was sales director of General Motors Diesel Ltd. of Canada. Mr. Hunter replaces **E. F. Bentley,** now on special leave of absence.

Norbert E. Willkomm succeeds the late **J. D. Allen** as acting manager, **Hamilton Steel Warehouse,** Jones & Laughlin Steel Corp., Cleveland.

Dr. Lauchlin M. Currie was appointed a vice president of **Union Carbide Nuclear Co.,** division of Union Carbide & Carbon Corp., New York. Dr. Currie was vice president of National Carbon Co., another division.

Palmetto Steel & Machine Co., Greenville, S. C., elected **Harry E. New** president-treasurer.

John W. Elsworth was made manager, special brands division, **R. M. Hollingshead Corp.,** Camden, N. J. He was assistant sales manager.

William C. Osborne was advanced

IS THIS A FORGING?

Not too long ago, this large component of high quality steel by necessity, would have been a casting, a fabrication or an expensive machining operation.

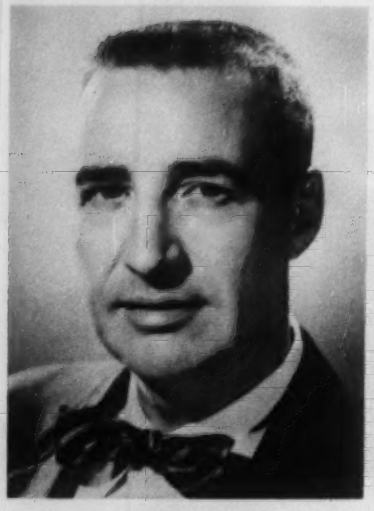
Now Cameron's Split Die Forging technique produces this piece as an integral forging with internal as well as external contours in sizes from 200 to 5,000 lbs. Machining difficulties are diminished, strength factors are improved and in many cases cost is reduced.

Maybe your product could be improved or more economically produced by using this type of forging.

WRITE *Cameron*

IRON WORKS, Inc.

SPECIAL PRODUCTS DEPARTMENT
P. O. Box 1212, Houston, Texas



LOUIS E. DONDERO
. . . Cleveland Rock Drill plant mgr.

to manager of engineering and **Everett C. Schmachtenberg** to assistant to the manager of engineering, Harrison, N. J., division, **Worthington Corp.**

Louis E. Dondero was named manager of the **Cleveland Rock Drill** plant of the Le Roi Division, Westinghouse Air Brake Co. He succeeds **Russell R. Morgan**, retired. Mr. Dondero, who joined Le Roi in 1946 as assistant service manager, was most recently manager of the service department.

Howard C. Jones joined **ConVac Division**, Consolidated Engineering Corp., Rochester, N. Y., as director of manufacturing. He was works manager, Delco Appliance Division, General Motors Corp.

Arthur C. Edwards was made field engineer by **Chiksan Co.**, Brea, Calif.

G. Arnold Roberts was made supervisor, engineering department, **Portland Copper & Tank Works**, South Portland, Me.

PAUL C. FORD
. . . Wagner Electric div. chief eng.

Wagner Electric Corp., St. Louis, appointed **Paul C. Ford** chief engineer of its electrical division to succeed **C. P. Potter**, retired. Mr. Ford was assistant manager of the transformer engineering division. Mr. Potter remains in a consulting capacity until the first of the year.

E. H. Fisher is in charge of a new industrial sales division of **Oliver Corp.**, Chicago.

Kawneer Co., Niles, Mich., appointed **Charles R. Sigler** manager of engineering. He is replaced by **B. W. Larsen** as manager of production engineering. **Charles L. Grosdeck** was made production manager. **James F. Ryan** was made plant manager at Lexington, Ky., and **John M. Edwards** manager of procurement to succeed Mr. Larsen.

J. C. Lindley is sales manager for the defense contracts organization of **Burroughs Corp.**, Detroit. **Harry B. Rottiers** was made director of defense contracts.

ROBERT F. LAY
. . . Cooper-Bessemer vice president

Robert F. Lay, general sales manager, **Cooper-Bessemer Corp.**, Mt. Vernon, O., was elected vice president-general sales manager.

Walter Gramm succeeds the late **George Skakel Sr.** as chairman of **Great Lakes Carbon Corp.**, New York. Mr. Gramm was senior vice president.

William H. Barney was made works manager, **Mather Spring Co.**, Toledo, O.

Minneapolis - Honeywell Regulator Co. named **James W. Hughes** regional industrial sales manager for the Midwest, with headquarters at Chicago. **Raymond A. Zack** was made industrial sales manager in the Hammond, Ind., branch office.

Robert A. Hummert was made Chicago district sales manager for **DeWalt Inc.**

Charles E. Keaton Jr. was made Detroit district manager, **Plasteel Products Corp.**

OBITUARIES . . .

Albert E. Whyman, 53, vice president in charge of European operations for **E. W. Bliss Co.**, Canton, O., died Nov. 9 in England.

Walter R. Neilson, 63, founder and president, **Neilson Wheel Co.**, Milwaukee, died Nov. 1.

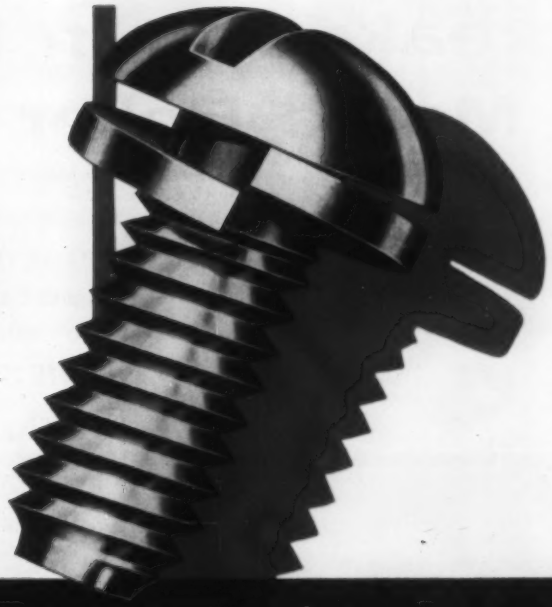
Clarence W. Driver, 68, president, **Sheet Metal Products Co.**, Euclid, O., died Nov. 3.

William E. Van Horn, 75, retired general manager, Buffalo Works, **Otis Elevator Co.**, died Oct. 28.

William E. Paris, former vice president, **Willys Motors Inc.**, Toledo, O., died Nov. 1.

Walter J. Wachowitz Sr., 62, president, **Alloy Products Corp.**, Waukesha, Wis., died Nov. 7.

A. S. Feldman, 74, president, **Stuart Radiator Core Mfg. Co.**, San Francisco, died Oct. 27.



Springtites® and Sems Automatically Reduce Costs . . . eliminate part losses

These days, when production savings can mean the difference between profit and loss at the end of the year, it will pay you to examine the efficiencies offered by Eaton-Reliance Springtites® and Sems. With the spring lock washer as an integral part of the screw or bolt, it is no longer necessary to assemble the two before application. Easier and faster assembly of bolted parts is the result. Waste, through loss of separate lock washers and screws, is reduced. Eaton-Reliance Springtites® and Sems are engineered to speed up your assembly time and give you more efficient fastenings for less.

Send for Engineering Bulletin S-49. The story is there for your consideration and there is no obligation, of course.

RELIANCE DIVISION EATON® MANUFACTURING COMPANY

OFFICE and PLANTS: 514 Charles Ave. MASSILLON, OHIO

Springtites® & Sems · Snap & Retaining Rings · Special Studs · Spring Lock Washers · Hex-Face-Nuts®

SALES OFFICES: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal

"No breakdown in 14 years with Morse Roller Chain"

—says Ajax Electric Company engineer

Ajax Electric Salt Bath Furnaces point up how roller chain can save operating costs, cut your downtime, give you flexible, dependable power.

Ajax Electric Co., Philadelphia, makes electric salt bath furnaces, used to temper metals. These furnaces use roller chain throughout for conveying and power transmission.

Alkali cleaner, molten salt, steam—each is a potential threat to the more than 2000 feet of chain used. Yet, for 14 years, drives like these have performed efficiently, *without a single breakdown.* (Read statement below.)

Furnace interior, from end. Main drives lie parallel along bed. Transfer chain drives convey fixture carriers.

←Operator hangs parts on fixture holder. By changing sprocket or adding or removing links, timing of drives can be altered.

"We've worked with Morse Chains for 14 years, and have never experienced a breakdown of this product during that period. And, in our complex installations of electric salt bath furnaces, Morse is giving us excellent results."

Philip N Attwood

Field Engineer
Ajax Electric Co.

Morse Roller Chain instantly adaptable

The metal parts hardened in these Ajax Furnaces often require "dip" periods that vary in length. By changing the number of links in a drive, or sprocket diameter, each step can be speeded up or slowed.

You, too, can get superior power transmission with Morse Roller Chain. Precision-made in all standard sizes and pitches. A wide variety of standard and special-purpose attachments are available.

Check these advantages of Morse equipment:

- √ Long service life
- √ Low operating cost
- √ Requires minimum maintenance
- √ Wide range of types and sizes
- √ Precision construction

Literature, engineering help FREE

Write today for Catalog C 51-50, or free consultation. Morse has skilled engineers available to help you solve practically any problem involving transmission equipment: Roller Chain, Hy-Vo Chain, Silent Chain, Sprockets, Clutches, and Couplings.

MORSE CHAIN COMPANY
INDUSTRIAL SALES DIVISION
ITHACA, NEW YORK

MORSE BW **CHAINS, CLUTCHES, AND COUPLINGS**

Expansion Spurts

Billion-dollar programs reflect widespread confidence in nation's economic outlook

EXPANSION of the nation's productive capacity shows no sign of slowing down.

Standard Oil of New Jersey will spend $1.1 billion next year for oil exploration and capital improvements, including 14 new supertankers, in addition to the 27 being built. An additional $100 million will be spent by companies in which the firm has an interest of one-half or less. "As far as I know," said Eugene Holman, chairman, "it will be the largest one-year capital outlay ever made by any industrial concern."

Big Get Bigger—Chrysler Corp. recently announced a $1 billion five-year expansion program. Ford plans to spend more than $1 billion over the next three years. General Motors, General Electric, Westinghouse and other industrial giants have big expansion programs under way.

These spectacular projects are accompanied by a great many smaller ones which are being announced daily. The aggregate is impressive. Some of the recent ones in the metalworking field are listed here.

Carborundum Co., Niagara Falls, N. Y., will spend $1.5 million to modernize and expand its refractories plant in Falconer, N. Y. The project will be done in progressive stages during the next five years.

McKay Machine Co., Youngstown, will realize a 25 per cent boost in its production capacity on completion of a $750,000 expansion program now in progress. The firm is constructing an addition to its plant No. 1, has acquired a 20,000-sq-ft building in that city and has purchased additional machine tools.

Tappan Stove Co., Mansfield, O., constructed a $300,000 addition to its plant.

Gear Grinding Machine Co., Detroit, completed a plant expansion, adding 33 per cent more floor space. The firm makes gear grinding and screw machines.

Ralston Steel Corp., Skokie, Ill., is building a new warehouse in that suburb of Chicago. It will contain 40,000 sq ft of floor area and will be equipped for shearing, slitting, decoiling and pickling operations.

Norton Co., Worcester, Mass., is

(*Please turn to page* 78)

American Steel & Wire Opens Warehouse in Detroit

One of the first orders of wire rope from American Steel & Wire Division's new Detroit warehouse is measured and re-reeled for shipment by C. J. Shanley. Also shown is E. A. Murray, manager of the division's Detroit district sales. The new facility will stock wire rope and electrical cable products shipped from A.S.&W.'s plants in Worcester, Mass., Trenton, N. J., and New Haven, Conn.

WHEN IT'S
Special BOLTS
and STUDS
Send your Specifications to
ERIE
40 years' experience in making special bolts, studs, nuts for specific job requirements.

Specialists in Precision High Quality
CONNECTING ROD BOLTS

REPRESENTATION IN PRINCIPAL CITIES

STANDARD
technical service clicks at Argus Camera

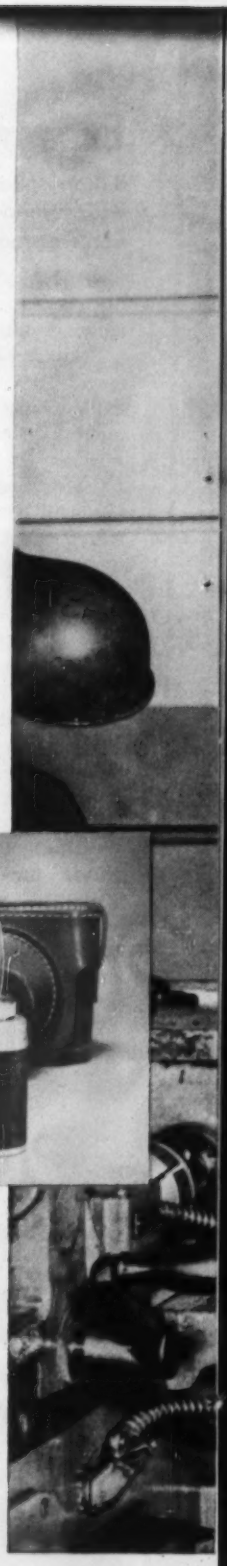
Personnel at Argus Camera Company were having trouble with the grinding of thread plug gauges. Grinding oils used failed to hold the required accuracy. They called in L. H. Walker, Standard Oil industrial lubrication specialist. He recommended Standard's SUPERLA Thread Grinding Oil A, and Argus began using it. That was four years ago. What happened? SUPERLA Thread Grinding Oil has helped Argus grind thread plug gauges with such accuracy, so consistently, rejects are virtually eliminated.

Small job? Yes. Small volume of oil used? Yes. But the results are big business to Argus Camera. That makes it important to Standard Oil. It is another demonstration of what this unbeatable combination can do when put to work:

1 Standard lubrication specialists capable of giving technical help.

2 Top quality products *that deliver results required.*

Put this combination to work in your plant. In the Midwest there is a lubrication specialist in your nearby Standard Oil office ready to help you. Call him. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



STANDARD

STANDARD OIL COMPANY
(Indiana)

Omer L. Parks (left), tool and gauge grinder for Argus Camera, inspects thread plug gauge with L. H. Walker, Standard Oil industrial engineer. Lyman Walker has been working with customers for 25 years helping them solve problems like the one at Argus. A native of Detroit, Lyman Walker is familiar with the lubrication problems of industry in the territory he serves. This together with his wide experience makes him ideally qualified for this work. Customers find his experience pays off for them.

HOW RUGGED IS YOUR ABRASIVE?

Is it rugged enough to prove itself in performance? You can't judge an abrasive by looks, claims or promises. The only test of any abrasive is its *cost per ton of castings cleaned.* Because of exclusive metallurgical characteristics, Malleabrasive gives you the lowest cost per ton cleaned of any premium abrasive on the market! This has been proved in hundreds of production tests by users throughout the country. Prove it in your own production test. *We GUARANTEE that Malleabrasive will give you lowest cost per ton of castings cleaned.*

To order Malleabrasive, or for additional information on running a test, contact Globe Steel Abrasive Co., Mansfield, Ohio.

U. S. Patent #2184926 (Other patents pending)

MALLEABRASIVE®

(*Concluded from page 75*)

constructing a $1,285,000 plant at Huntsville, Ala. Products: Fused magnesia, fused zirconia, boron carbide, plus special materials for the Atomic Energy Commission. The plant will supplement Norton's electric furnace facilities in Chippawa, Ont.

General Electric Co., Schenectady, N. Y., will build a plant costing more than $5 million at Lynchburg, Va. It will be the new home for GE's rectifier department, now at Lynn, Mass., and Limerick, Me. Construction will start in March.

Rheem Mfg. plans to build a plant in Fullerton, Calif., which will be leased to Rheem Automotive. The plant and equipment will require an investment of more than $6.5 million. Highly efficient plating lines, representing a substantial increase in capacity, will be included at a cost of more than $2 million.

Buys Aluminum Sash Line

Luria Steel & Trading Corp., New York, purchased the Hunter Aluminum Prime Window Division of F. C. Russell Co., Cleveland. Hunter makes aluminum sash at a plant in Bristol, Pa. The business will be expanded under the newly organized Luria Building Products Inc., New York. Herbert B. Luria is president of both firms.

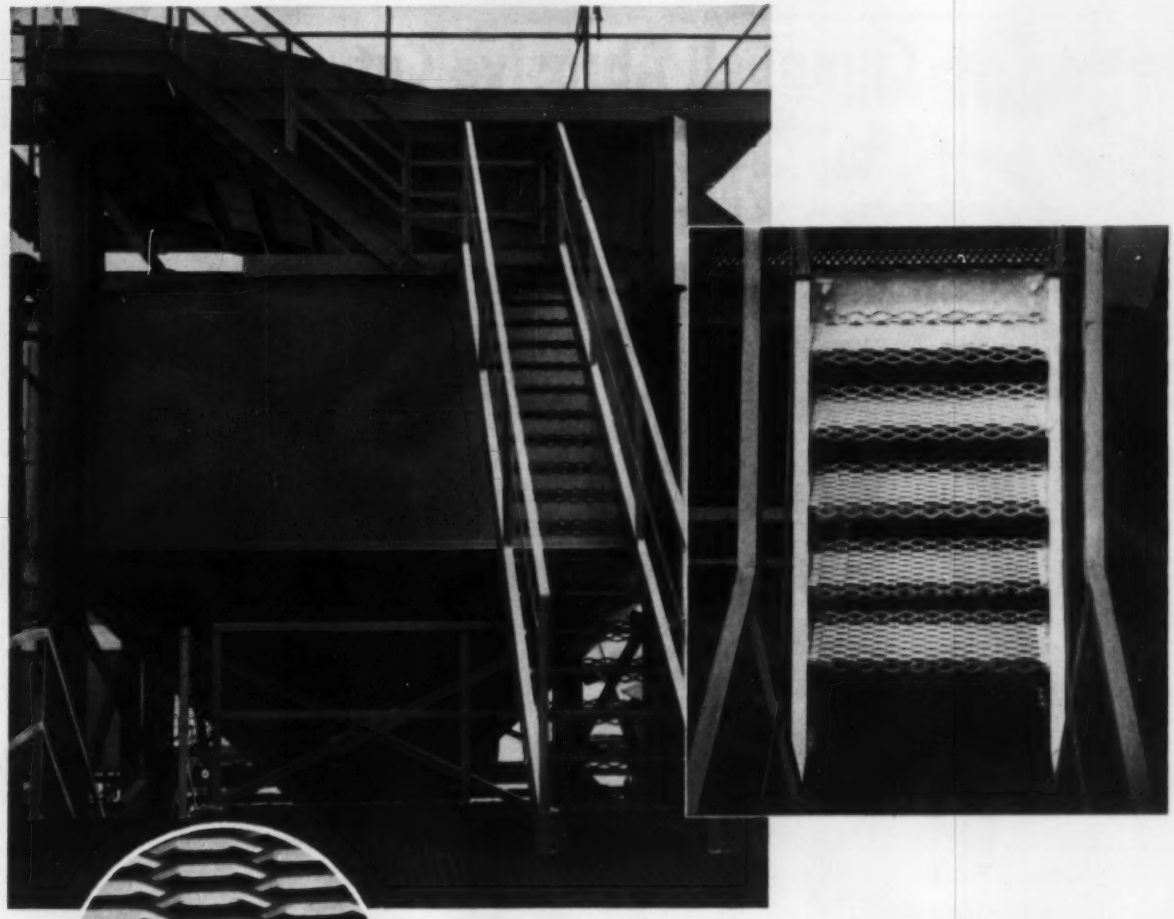
Klem Chemicals Opens Plant

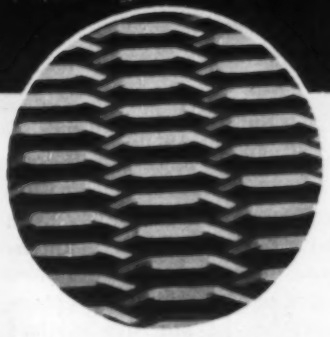
Klem Chemicals Inc., Dearborn, Mich., opened a plant at 1905 N. Central Ave., El Monte, Calif. The plant, under Jack Borkman as general manager, will make compounds for metal cleaning, rust removing, and paint removing and phosphate coatings.

Gas Machinery Gets Contracts

Gas Machinery Co., Cleveland, will furnish and install a rotary furnace, car furnaces, batch-type furnaces, manipulators and quench system for the new ring rolling plant of Copper Alloy Corp. It is being built in Clark township, Union county, New Jersey. The plant was designed by Loewy Construction Co. Inc., New York.

The Cleveland firm also was





← cuts costs up to 25% on FLOORING and STAIR TREADS

Armour and Company, near Bartow, Florida, had a grating problem: How to provide 18,000 square feet of open steel flooring and several hundred stair treads, for structures in their new Phosphate Recovery Plant... *economically!* The flooring and treads had to be open to allow drainage of water used in the washer operations. Their solution: Penmetal 4.27 TREADWAY (expanded metal grating).

Used as flooring and stair treads instead of conventional grating, Treadway cuts costs up to 25% per square foot of floor area.

The photographs above illustrate typical sections of floor area, and the unique method used in the fabrication of the stair treads. Each tread is a single piece of Treadway turned to a 90° angle at the front and rear edges. This forms a kick plate and makes the tread even stronger. Most of the treads in this installation are 36" long and will support a 200 lb. man at mid-span, with no apparent deflection.

This rugged, economical steel grating, with slip-resisting safety inherent in its design, is practical for many other applications where safe footing, durability, fabrication costs, and appearance are factors.

Send for complete details of this open steel flooring of economy.

PENN METAL COMPANY, INC.

General Sales Office:
205 East 42nd Street, New York 17, N. Y.
Plant: Parkersburg, W. Va.

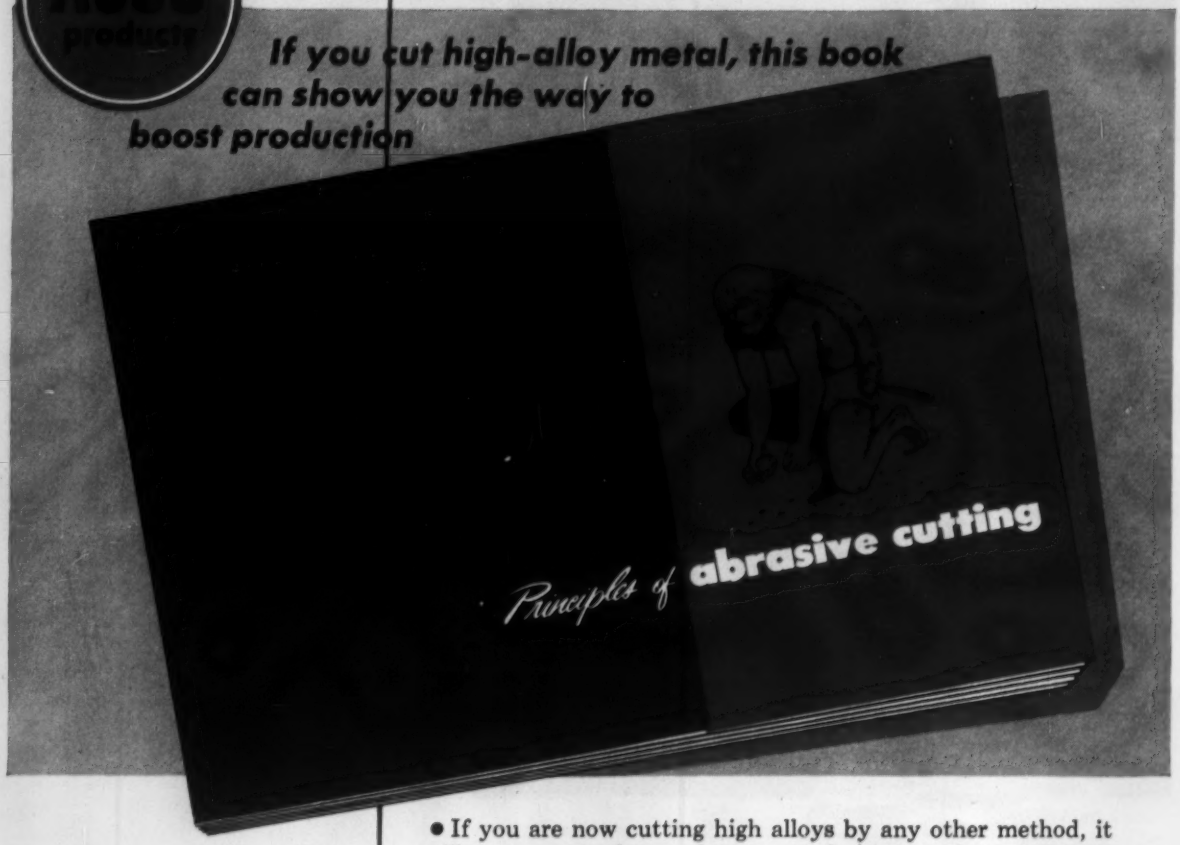
Penmetal

PM-73

Campbell Abrasive Cut-off Machines

ACCO products

If you cut high-alloy metal, this book can show you the way to boost production



CAMPBELL OFFERS WIDEST SELECTION OF ABRASIVE CUT-OFF MACHINES FOR EVERY NEED

Capacities—from 1" to 12" diam. solids

Hand-operated submerged cutting machines

Wet or dry machines for general shop requirements

Bar-cutting machines for continuous production

All-purpose wet abrasive horizontal cutting machines

Fully-automatic wet abrasive cutting machines

Hydraulically-operated, wet abrasive cutting machines

Rotary-oscillating-hydraulic wet abrasive cutting machines

• If you are now cutting high alloys by any other method, it will pay you to know the many advantages that CAMPBELL abrasive cutting can bring.

LOW COST FACTOR When cutting sections abrasively from bar lengths for forging, the metal may be purchased "unannealed." In some cases, saving the annealing cost will more than pay for cutting. Smooth cutting of abrasive process saves cost of smoothing operations. Accuracy of abrasive method reduces scrap loss.

HIGH QUALITY FACTOR High quality control standards are usually maintained by laboratory testing of specimen cuts. With abrasive cutting, metal can be cut in practically any condition—soft, hard, annealed or unannealed—with cut-off pieces ready for deep etching.

• Find out TODAY what the CAMPBELL methods can do for you. Testing procedure by CAMPBELL engineers will show conclusively whether abrasive cutting machines will save YOU money.

Write for DH-301 "Principles of Abrasive Cutting" today

ACCO

TRADE MARK

Campbell Machine Division
AMERICAN CHAIN & CABLE

925 Connecticut Avenue, Bridgeport 2, Connecticut

Better Value

awarded a contract by Sharon Steel Corp., Sharon, Pa., to install a continuous strip annealing furnace for its Detroit Tube & Steel Division, Detroit.

General Cable Builds in South

General Cable Corp., New York, is constructing a manufacturing plant on E. Hanna street, Tampa, Fla. The first unit will have about 50,000 sq ft of floor space and will be equipped to make paper telephone cable and other wires and cables.

Forms Industrial Products Unit

Maryland Shipbuilding & Drydock Co., Baltimore, established an Industrial Products Division. For a number of years the firm has made many types of power plant and industrial equipment. It is combining and co-ordinating these activities in the new division. W. F. Jameson is manager of engineering; Philip Myers Jr. is manager of sales.

Stamping Firm Changes Hands

Progress Mfg. Co. Inc., Philadelphia, maker of fluorescent and incandescent fixtures for home use, acquired Judson & Rose Inc., that city, metal stamping manufacturer. C. G. Rose, president of Judson & Rose, will be chief executive officer of the subsidiary.

Veeder-Root Builds Plant

Veeder-Root Inc., Hartford, Conn., is building a $1.5-million plant at Altoona, Pa. One of the most modern diecasting operations, along with closely allied assembly and machining departments, will be installed to make gasoline-pump computers and oil-tank registers.

Distributor Opens New Plants

Metal Goods Corp., metal distributor, opened a new warehouse and headquarters building at 8800 Page Blvd., St. Louis. Nelson Hower is the St. Louis district manager. The firm also opened a plant at Madison and Industrial avenues, Wichita, Kans., under the

(*Please turn to page* 84)

DO YOU NEED ANSWERS TO THESE QUESTIONS?

1 How can I electroclean steel at lower cost?

2 How can I find a brass cleaner that gives better protection against tarnishing?

3 How can I reduce rejects due to faulty electrocleaning of zinc die castings?

***Answer* 1** Following an Oakite recommendation, one plater made a small change in his steel-cleaning cycle and soon had two tankfuls of cleaning solution doing the work of three—and the plate adhesion was improved. *See booklet offered below.*

***Answer* 2** Oakite has a new brass cleaner that provides scientific protection against the oxygen that tarnishes brass and other copper alloys during the application of reverse current. *See booklet offered below.*

***Answer* 3** Oakite has an anodic conditioner that offers brighter plating of zinc die castings . . . with no anodic blackening and fewer rejects. *See booklet offered below.*

FREE For more information about the electrocleaning of steel, brass or zinc die castings, ask for one or all of the booklets listed in the coupon.

four good steps toward better electroplating on steel
NEW
Good news about electrocleaning zinc-base die castings
OAKITE

Technical Service Representatives in Principal Cities of U. S. and Canada

OAKITE PRODUCTS, INC.
34E Rector Street, New York 6, N. Y.

Send me the free booklets I have checked below:

☐ "Four good steps toward better electroplating on steel"

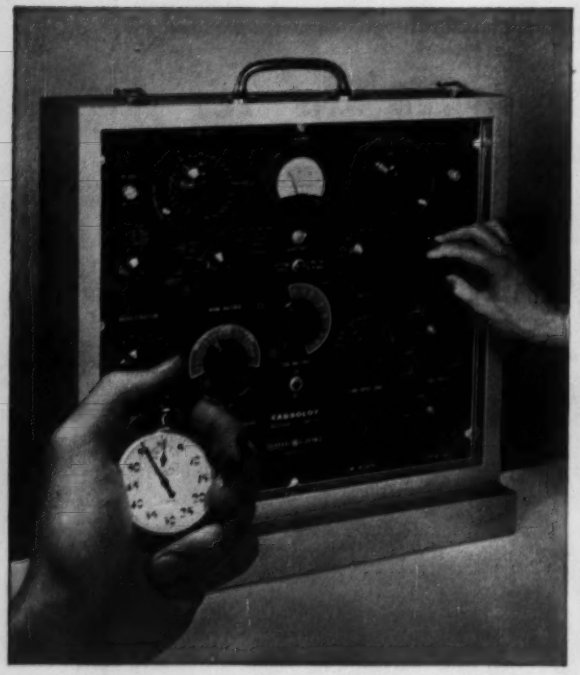
☐ "What's NEW for electrocleaning brass and other copper alloys"

☐ "Good news about electrocleaning zinc-base die castings"

Name.....

Company.....

Address.....



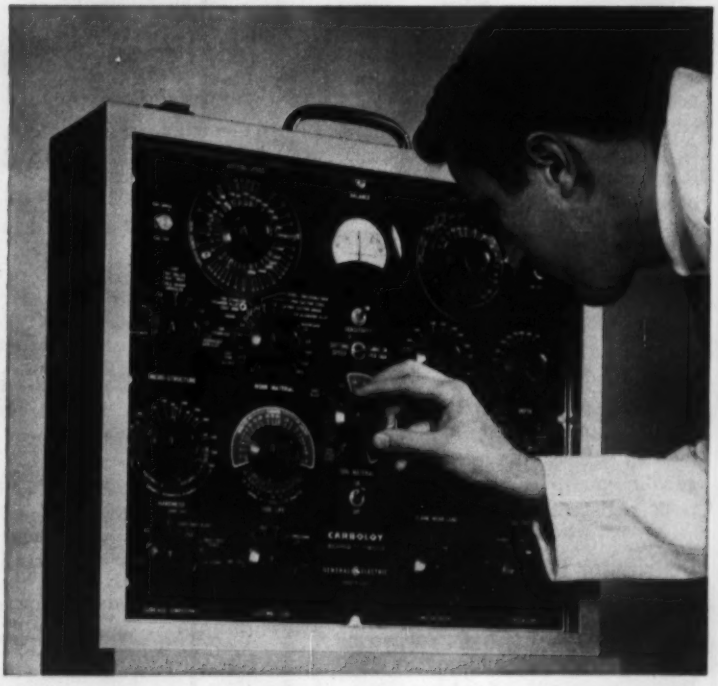
SOLVE MACHINING PROBLEMS IN SECONDS

The Carboloy Machinability Computer can determine the most efficient values for any of these 19 basic operating variables:

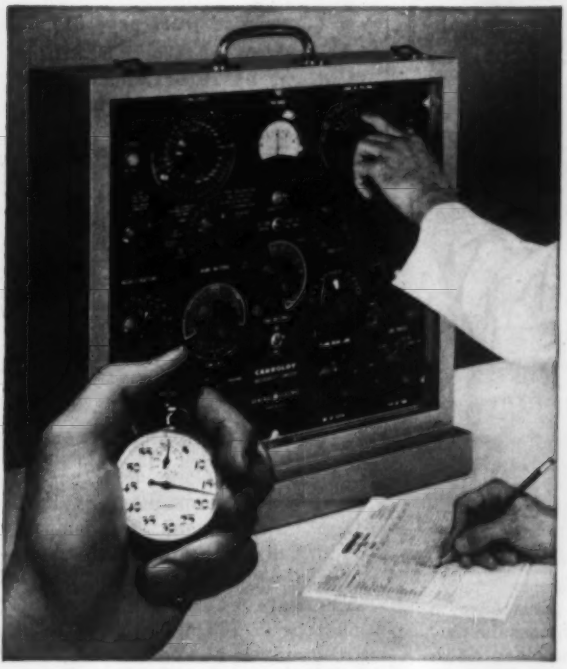
Material to be cut: Work material, microstructure, hardness, surface condition.

Cutting tool: Tool material, tool life, flank wear land, tool profile, type of tool, number of teeth.

Cutting conditions: Cutting fluids, feed, depth of cut, cutting speed, motor horsepower, cubic inches per minute, unit horsepower, work diameter, R.P.M.



CARBOLOY
DEPARTMENT OF GENERAL ELECTRIC COMPANY



Set dials for the values of each of the known variables. (Time: 1 – 2 minutes.)

Turn dial of unknown variable until meter balances at zero setting. (Time: 10 – 15 secs.)

Read the answer directly off the dial. No computations are necessary. (Time: 10 secs.)

WITH CARBOLOY MACHINABILITY COMPUTER

- **Calculate production, tool life, horsepower, or any of 16 other basic machining variables**
- **Eliminate wasteful tryout runs, improve existing setups**

The Carboloy Machinability Computer is a new engineering tool designed to solve complex machine setup problems in seconds, instead of hours.

It calculates the effect of the 19 most critical machining variables on the material to be cut, the cutting tool, and the cutting conditions . . . shows how to set up optimum operating conditions for any metal-cutting job, and how to improve existing setups by the right variation of operating conditions.

For production men, methods men, etc.

The Computer assists production men by determining rate of metal removal, and by immediately showing how production is affected by changes in feed, speed, depth of cut, tool material, and other key variables.

The Computer eliminates wasteful, nonproductive trial runs, saving valuable stock and setup time. It also determines machine output for methods men, pieces per hour for estimators, and it answers other problems pertaining to machining . . . providing accurate solutions in seconds for problems that normally take hours for even approximate answers.

Easy to use

The Carboloy Machinability Computer is easy to operate. Anyone with machining experience can use it after a short familiarization period.

The computer is portable (weighs only 32 lbs.), battery-operated, and measures 21″ x 7″ x 20″. The price of the computer is $495, f.o.b. factory, Detroit.

Whether your plant is large or small, the Carboloy Machinability Computer can pay for itself by increasing production, reducing manpower costs. For full details, or to arrange a demonstration at your plant, send coupon today.

CARBOLOY
Department of General Electric Company
11141 E. 8 Mile Road, Detroit 32, Michigan

☐ Send me information on the Carboloy Machinability Computer.

☐ Have a representative call to demonstrate the Computer.

Name _____

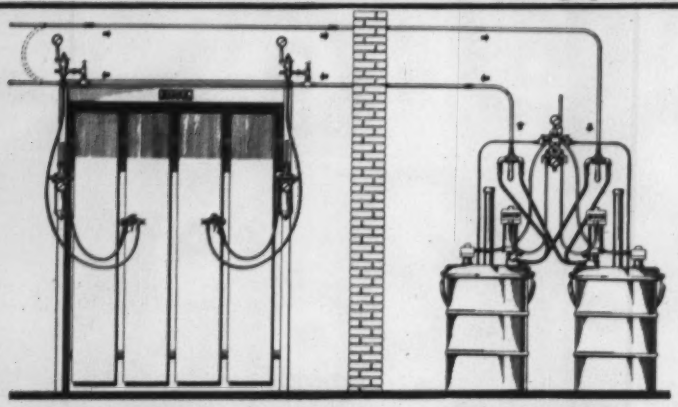
Title _____

Company _____

City _____ Zone ____ State _____

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

WHAT'S NEW in material handling pumps



pump paint through a mile of pipe... ...supply any number of spray guns

Binks new air-operated material handling pumps open the way to paint circulating systems for every size plant.

In a system of this kind, paint is circulated under pressure past each spray station and back to the drum. Binks new material handling pumps are ideal for this purpose. They can force paints of average spraying viscosity through a mile of suitable piping, *direct from the original drum* or from mixing tanks.

Now you can centralize all material handling, paint mixing, and viscosity control in one spot, with these major advantages: Color matching of component parts is easy. No time is required to transport paints to the spray stations or to clean and fill pressure tanks. Spillage and paint contamination are eliminated.

The above diagram shows a two-pump-per-color system. One pump supplies paint to the spray guns while the other is raised to allow replacement of the empty drum... or is agitating the paint prior to pumping. A valve switches the flow from one pump to the other. Not a moment's production is lost.

Here are some of the new features which make Binks pumps your best buy:

Power-plus: These new pumps will feed paint to any number of spray guns.

Delivers more: Pumps paint on both up and down stroke. Have longer stroke for greater volume.

Low maintenance: Ruggedly built to stand up under hard, continuous operation. Dust and dirt can't enter the new Auto-Cycle air valve. Fluids cannot work up into the motor. No lubrication required.

Uses less air: Large ports minimize back pressure. Precision manufacture reduces friction.

Send today for your copy of Binks Bulletin 701 which describes the many advantages and economies of a paint circulating system using Binks Material Handling Pumps. Binks engineers will be glad to help you select and install the right equipment. Write to the address below:

Binks air-operated pump elevator speeds up drum changing

This new Model 41-9000 air-operated pump elevator pays for itself many times over in the time and labor it saves. It quickly lifts the entire pump assembly clear of a 55-gallon drum and holds it there while drums are changed.

GUNS

COMPRESSORS

FREE INSTRUCTION

Binks EVERYTHING FOR SPRAY PAINTING

Binks Manufacturing Company
3122-30 Carroll Ave., West, Chicago 12, Illinois

150-55

REPRESENTATIVES IN PRINCIPAL U. S. & CANADIAN CITIES • SEE YOUR CLASSIFIED DIRECTORY

(*Concluded from page* 81)

managership of Clark Brown; a third one at 1970 Latham, Memphis, Tenn., under the managership of G. C. Meek Jr.

Enters Machinery Field

Production Machinery Corp. has been organized to make slitting, shearing, coil and sheet handling equipment and similar machinery. Headquarters are at 38905 Mentor Ave., Cleveland. Neil J. Ranney is president.

Ekco-Alcoa Containers Formed

Ekco-Alcoa Containers Inc. has been formed to manufacture aluminum foil containers. The company is owned jointly by Ekco Products Co. and Aluminum Co. of America. A $5-million plant, with an area of 165,000 sq ft, is under construction in Cook county, near Wheeling, Ill. John M. Mitchell, previously manager of Alcoa's Export Division and Commercial Research Division, is president and general manager of the new company.

ASSOCIATIONS

Offices of **Electric Overhead Crane Institute** have been transferred from New York to 1 Thomas Circle, Washington 5, D. C. Joe H. Peritz has been appointed executive secretary. W. W. Peattie, president of Northern Engineering Works, Detroit, is president of the institute. J. T. Sohn of Bedford Foundry & Machine Co., Bedford, Ind., is vice president.

Conveyor Equipment Manufacturers Association, Washington, elected these officers: President, E. E. Boberg, Standard Conveyor Co., North St. Paul, Minn.; vice president, J. H. Walker, Fairfield Engineering Co., Marion, O.; treasurer, A. W. Rich, Fairmont Machinery Co., Fairmont, W. Va.; and secretary, H. E. Murken, Hewitt-Robins Inc., New York.

National Tool & Die Manufacturers Association elected these officers: President, J. N. Huser, B & H Specialty Co. Inc., Indianap-

what is the gauge of steel plate quality?

The quality of any product is hard to gauge exactly. Two of the most accurate gauges of steel plate quality are, first, the degree of control exercised over its production—during *every* step from iron ore to finished plate—and, second, its acceptance by fabricators and users.

When you order Claymont Carbon and Alloy Steel Plates—including Abrasion-Resistant and Low Alloy High Strength Steel Plates—you are assured of top quality . . . because each step is conducted in CF&I's own blast furnaces, open hearths and rolling mills, following the most rigid control and testing standards. Throughout the operation, the steel is constantly tested by our metallurgists to assure proper physical and chemical properties, to meet the exact requirements of *your* job.

But in the final analysis, the proof of product quality is always in its use. Claymont plates are being ordered by fabricators everywhere for a wide variety of uses, because they have proved their high quality time after time. You can order them in standard ASTM and AISI specifications, as well as special plates for special applications. To get full details, contact our nearest sales office or write to Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P. O. Box 1951, Wilmington, Del.

CF&I **Claymont Steel Products**

3538

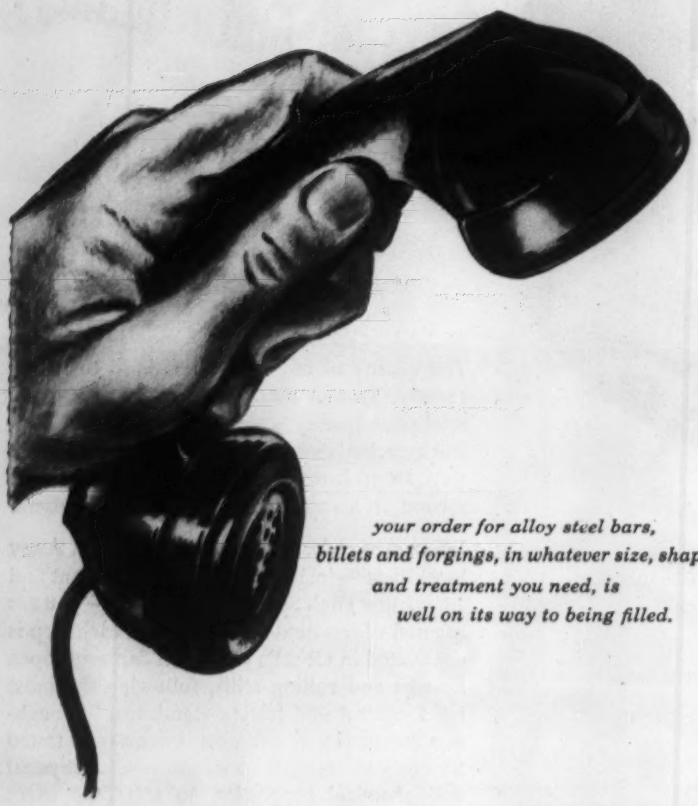
Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation

Abilene • Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver • Detroit • El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Los Angeles
New Orleans • New York • Oakland • Odessa • Oklahoma City • Philadelphia • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Tulsa • Wichita
CANADIAN REPRESENTATIVES AT: Edmonton • Toronto • Vancouver • Winnipeg

OTHER CLAYMONT PRODUCTS

Stainless-Clad Plates • Flanged and Dished Heads • Manhole Fittings and Covers • Large Diameter Welded Steel Pipe • Flame Cut Steel Plate Shapes • Lectro-Clad Nickel Plated Steel

Before you hang up,



your order for alloy steel bars, billets and forgings, in whatever size, shape and treatment you need, is well on its way to being filled.

All seven of our modern warehouses are located in principal industrial areas . . . near you. Each one is well-stocked: equipped to fill your alloy steel requirements promptly, whether you need standard AISI, SAE or our own special HY-TEN steels—"the standard steels of tomorrow". Every warehouse, too, is staffed with experts in metallurgy who are ready to serve you.

Write today for your FREE copies of Wheelock, Lovejoy Data Sheets. They contain complete technical information on grades, applications, physical properties, tests, heat treating, etc.

near you . . .

Warehouse Service — Cambridge • Cleveland • Chicago
Hillside, N. J. • Detroit • Buffalo • Cincinnati
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WHEELOCK, LOVEJOY & COMPANY, INC.

131 Sidney Street, Cambridge 39, Massachusetts

olis; first vice president, Herbert Harig, Harig Mfg. Corp., Chicago; second vice president, P. R. Marsilius, Producto Machine Co., Bridgeport, Conn.; secretary, H. G. Murdock, Arrowsmith Tool & Die Corp., Los Angeles; treasurer, R. C. Renner, East Dayton Tool & Die Co., Dayton, O.

Drop Forging Association will move its headquarters on Dec. 1 to 419 S. Walnut St., Lansing, Mich. Richard Marcus has been appointed assistant secretary-treasurer.

NEW ADDRESSES

American Management Association moved its administrative headquarters to 1515 Broadway, New York 36, N. Y.

Gilbert-North Inc. moved to new quarters at the Reynolds Industrial Development, 4 miles south of Greenville, Pa. Yard equipment is designed to handle alloy scrap at top efficiency.

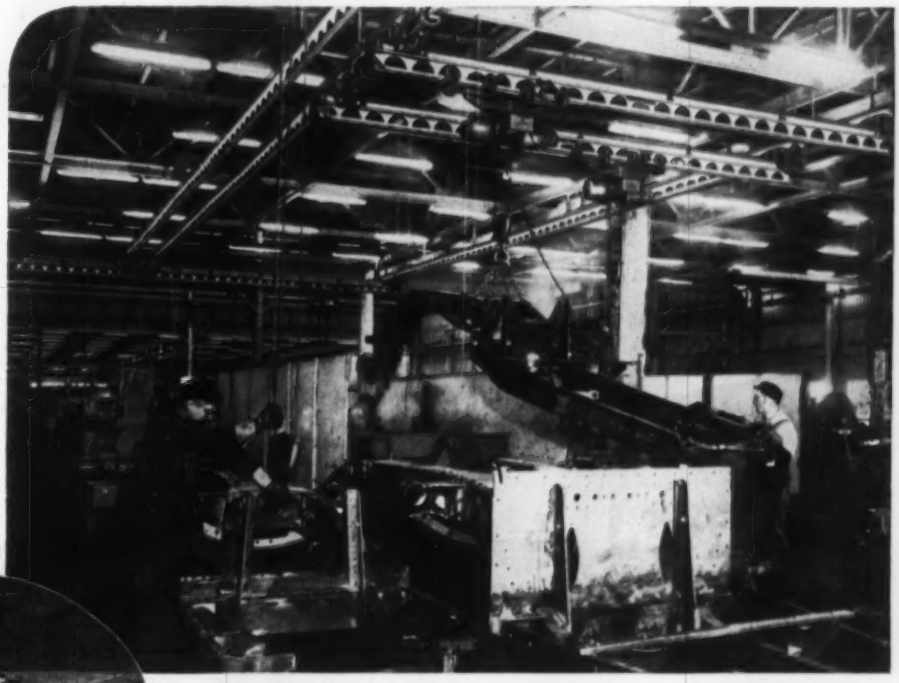
Grobet File Co. of America Inc. moved its offices, factory and warehouse to Carlstadt, N. J. The firm makes rotary files, countersinks and other industrial tools.

REPRESENTATIVES

Tipp Mfg. Co., Tipp City, O., appointed as its sales representatives: Alfred B. King Co., North Haven, Conn.; Elmer A. Skonberg of Machinery Sales Co., Louisville; H. M. Sawrie & Co., Chattanooga, Tenn. Tipp makes Cable-Way conveyors.

Oliver Iron & Steel Corp.'s Pole Line Materials Division, Pittsburgh, appointed Shaffer & Nelson, Seattle, and Roy Peck Associates, Arcadia, Calif., representatives in their territories.

Rivett Lathe & Grinder Inc., Boston, appointed Benedict Engineering & Sales Co., Birmingham, as representative for its line of air and hydraulic valves and cylinders and power units.



A hand-propelled interlocking crane system with two-ton electric hoists makes the handling of heavy parts easy in the Motor Grader Frame Assembly Section, Peoria, Illinois, Plant.

Caterpillar Diesel No. 12 Motor Grader in action.

EXTENSIVE TRAMRAIL INSTALLATIONS SERVE TWO GIANT CATERPILLAR TRACTOR CO. PLANTS

Peoria Plant Alone Has $1,000,000 Installation

SINCE the first small initial order for Cleveland Tramrail was placed by Caterpillar Tractor Co. over a quarter of a century ago, their installation has grown steadily until now in the vast Peoria Plant alone there is considerably more than one million dollars' worth in operation.

A large part of the job in building tractors, motor graders, diesel engines, etc., is handling materials. It is calculated that 20 tons of handling is required for each ton of tractors or diesel engines shipped from the plant. Saving a few minutes on each ton handled, amounts to a tremendous overall figure and resultant dollar savings.

Because of changes brought about by rapid plant growth, new models, or adoption of more advanced methods, for which Caterpillar is noted, it is often necessary to dismantle and re-erect Tramrail equipment. The ease with which this can be done with Cleveland Tramrail has proven to be especially advantageous to Caterpillar. Equipment serving one area can be taken down and installed in another area for use on an entirely different handling operation in very little time and usually without interfering with production.

Like Caterpillar, your plant, whether large or small, most likely can profit with Cleveland Tramrail.

GET THIS BOOK!
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7879 EAST 284th STREET, WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Your end walls will last longer

with Kaiser Periclase-Chrome Brick

Open hearth operators have discovered two important facts about Kaiser Periclase-Chrome Brick:

1. It can greatly increase end wall life if needed.
2. If end wall service is balanced, thinner walls can be used to reduce cost.

That's because the special composition of Kaiser Periclase-Chrome Brick assures less spalling, less swelling, greater resistance to abrasion and alteration by oxide and slag.

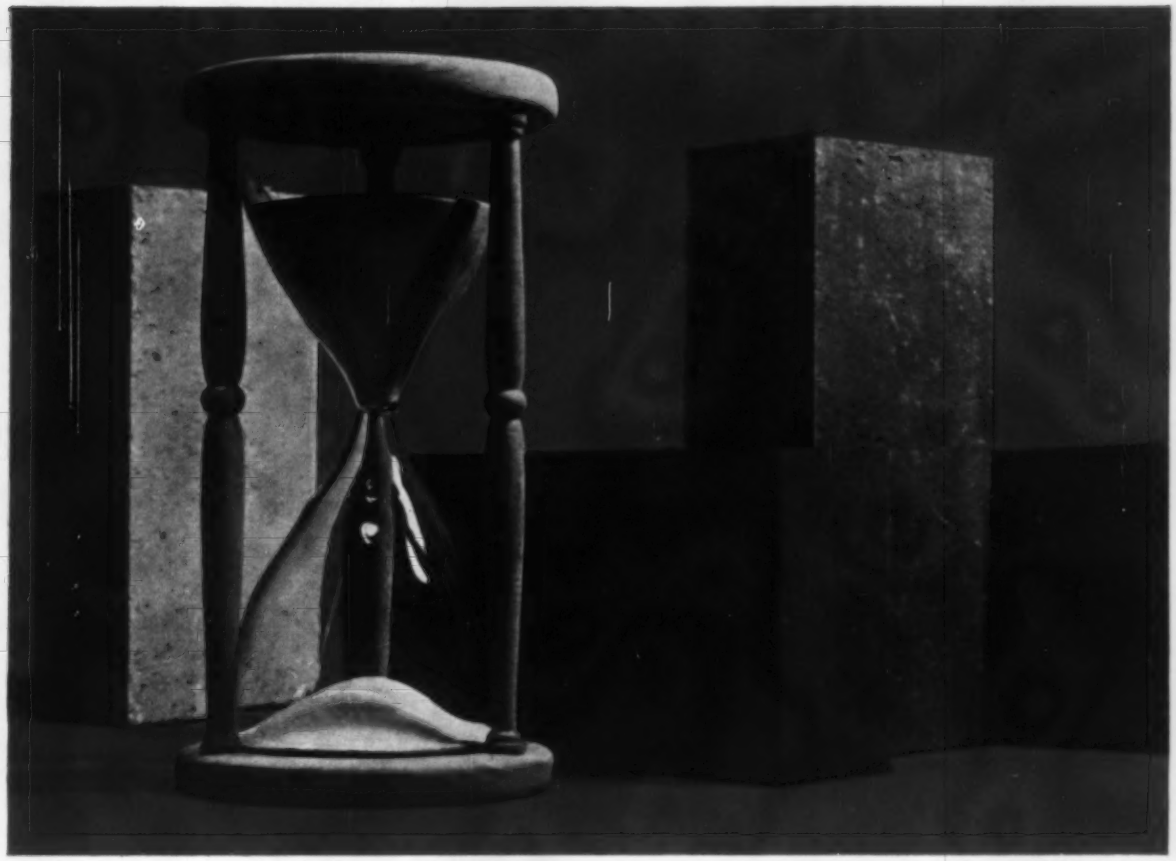
Let your Kaiser Chemicals sales engineer explain how you can get longer life from your end walls or reduced wall thicknesses with Kaiser Periclase-Chrome Brick. Call or write any of the sales offices listed below for immediate attention to your particular problem.

Call or write Kaiser Chemicals Division, *Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway,* OAKLAND *12, Calif. . . . 3 Gateway Center,* PITTSBURGH, *Pa. . . . 518 Calumet Building, 5231 Hohman Ave., Hammond, Indiana* (CHICAGO).

For the ultimate in steel furnace refractories

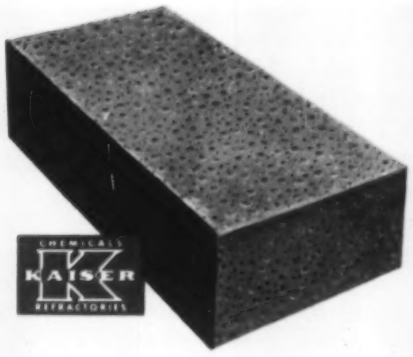
SOME OF THE REASONS YOU GET BETTER SERVICE WITH KAISER PERICLASE-CHROME BRICK:

1. Chromite content is the minimum amount (only 9.1% Cr_2O_3) necessary to provide thermal shock resistance. Lowering of chromite reduces swelling, thus minimizes end wall buckling.
2. A ceramic bond is formed *before* the chemical bond is destroyed.
3. No liquid phase in forming its ceramic bond. Volume stability.
4. Highest MgO content end wall brick provides greater resistance to carryover erosion and iron oxide attack.
5. Lowest porosity minimizes alteration by resisting penetration of gases and impurities.



think of Kaiser Chemicals

Pioneers in Modern Basic Refractories



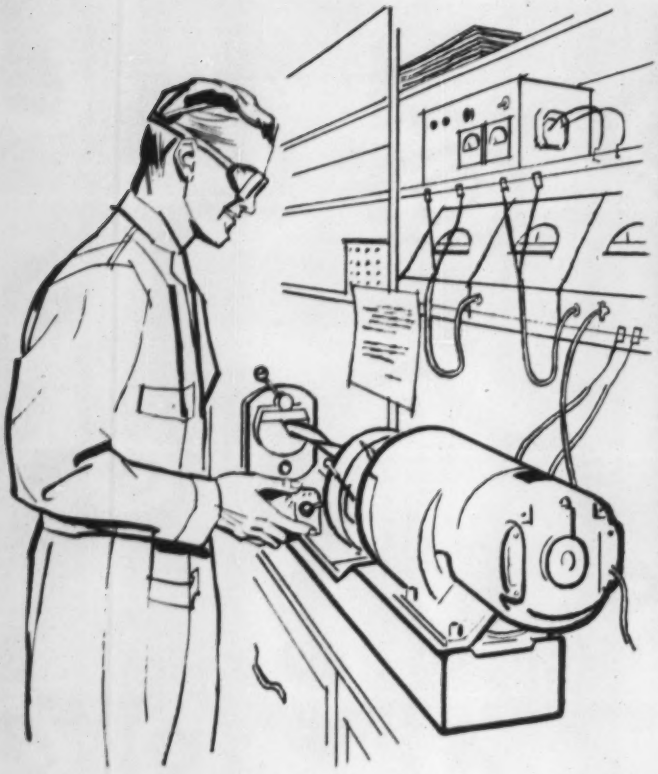
REFRACTORY BRICK • RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE

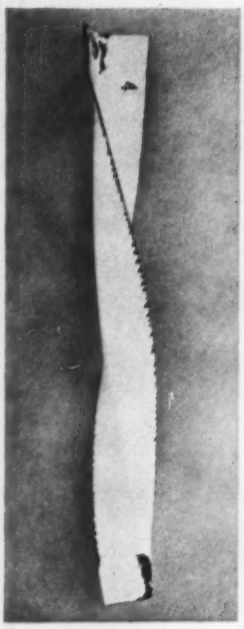
Kaiser PERICLASE Brick for the Steel Industry:

- Periclase Brick (D-S)
- Periclase Chrome Brick
- Chrome Periclase Brick

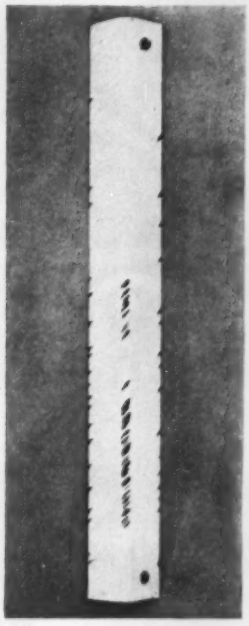
***Now available!* A companion mortar for Kaiser D-S brick. High purity periclase composition *and* maximum workability.**

Installation advice on request





Enameling iron, with 1 coat of porcelain enamel over Parker Pre-Namel 410, was twisted 255° before enamel fractured.



Enameling iron, with conventional 2-coat system of porcelain enamel, fractured badly when twisted only 70°. (Twisted less than its elastic limit, metal returned to its original shape).

NEWS OF A REVOLUTION
in porcelain enameling

Porcelain enameling on steel has always been a preferred finish. However, its use has been limited by cost and by difficulties in the processing.

Now, a big change is about to take place.

Parker Rust Proof Company's research has discovered and developed a surface treatment for steel which permits the application of the porcelain enamel finish coat directly to ferrous metals, reduces cost, improves quality and eliminates many production difficulties in porcelain enameling. Pilot runs and production tests have shown that the new Parker process is effective and practical.

The new treatment, making use of Parker Pre-Namel 410, has been shown to simplify porcelain enameling, achieve high quality uniform results, reduce use of frit, produce a more durable finish. Savings of from 1 to 3 cents per square foot of enameling surface are indicated.

Now, with Parker Pre-Namel, porcelain enameling may be used more widely, bringing the advantages of this superior finish to more and more products.

Write for full information.

*Bonderite, Bonderlube, Parco, Parco Lubrite, Parker Pre-Namel—Reg. U.S. Pat. Off.

1915 40th year 1955

Since 1915—Leader in the Field

PARKER RUST PROOF COMPANY

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BONDERITE	BONDERITE and BONDERLUBE	PARCO COMPOUND	PARCO LUBRITE	TROPICAL
corrosion resistant paint base	aids in cold forming of metals	rust resistant	wear resistant for friction surfaces	heavy duty maintenance paints since 1883

Technical Outlook

ANOTHER STEP—A milestone on the road to the automatic steel mill was unveiled at U. S. Steel's Irwin Works on Oct. 10. It's an automatic gage control system with nine transistors for a "brain," developed jointly with GE. Operating on a 5-stand tandem cold reduction mill, it holds final tolerances to ±0.0001-in. The gage is the first to use screw down control to vary reduction on the first stand in combination with a vernier system regulating roll speed on the last stand.

HEAT TRANSFER—New low melting alloys which may be used as liquid metal heat transfer media have been discovered. They are in the group that includes bismuth, indium, lead, tin and thallium, according to a report of Navy research. The alloys have freezing points below 210° F and do not expand on freezing and cooling to room temperature. Vapor pressure is low up to 1500° F. They do not cause static corrosion of construction materials.

TELLTALE DROP—A drop of water tells when metal surfaces are clean enough for maximum strength bonding with adhesives. A drop that stands up sharply, making a steep angle of contact, indicates a surface that needs better cleaning for good bonding. If the drop spreads out or makes a low angle of contact, the adhesive joint should be a strong one, says Franklin Institute.

GRINDING STRESSES—Recent tests indicate lubrication is more important than cooling in grinding hardened steels. In his experiments, H. R. Letner, senior fellow, Mellon Institute, Pittsburgh, used air, two concentrations of rust inhibitor in water, six water-miscible oils and four straight grinding oils. He reported at ASME's annual meeting: 1. Stresses produced with water-rust inhibitor coolants or miscible oils differed little from those in dry grinding. 2. Straight grinding oils gave some reduction in peak tensile stresses, and are conductive to high compressive stresses close to the surface. 3. Effectiveness of the fluid depends on its ability to reduce stresses during chip formation rather than the ability to take heat away.

LONG LIFE—A beryllium-copper plunger tip on a 450-ton, cold-chamber, diecasting machine still is in good condition after more than 510,000 cycles. Ohio Casting Co., Columbus, O., says this amount of work would wear out 70 of the tips it previously used. The Be-Cu tips are used for such jobs as diecasting aluminum locknuts for plumbing at 160 cycles per hour.

WATER REDUCTIONS—The first water-cooled rectifier transformers to be used on an aluminum pot line cost less, weigh 35 per cent less and occupy only half the floor area of previously used air-cooled ones. Westinghouse installed them at Anaconda Aluminum Co., Columbia Falls, Mont.

BIGGER BRAIDS—If you think of a use for tubular metal braid 30 in. in diameter, there's a machine at the Niles, Mich., plant of the National-Standard Co. that can make it. It's producing metal braided hose coverings up to 22 in. in diameter, with wire as thick as 0.028-in.

HIGH-TEMP HYDRAULICS—Future development of hydraulic components for high-temperature applications should center on improvement of the seals rather than mechanical design. That's the conclusion of K. I. Postel, chief design engineer, aircraft products, Vickers Inc. During tests, inlet and ambient temperatures were maintained at 550° F.

Metalworking Outlook—p. 41 *Market Outlook—p. 125*

Maintenance for Automation

By ROBERT F. HUBER
Machine Tool Editor

ONE THING is certain about automation. It's forcing seat-of-the-pants maintenance out of style.

Where the maintenance man used to be a clever jack-of-all-trades, he's now a trained specialist. Where he used to be on call to make repairs, he's now on patrol to anticipate repairs.

The System—This, most authorities agree, is the key to successful maintenance of an automated plant or line: You must have a system, and the system must be positive.

It may take a subtle shift in the thinking of maintenance supervision. Instead of maintaining machines, they're now required to maintain production. The difference is slight but fundamental.

Detectives—Down time becomes a veritable monster with automation. The machine that turns out hundreds or even thousands of parts in an hour can't be spared from the production line. It becomes critically important to shave minutes off any down time.

Even the time required for the trouble to be reported and the maintenance man to get to the machine is worth saving.

Teams—The answer lies in having one or more maintenance men cover a production area. Their full-time job is to patrol and service equipment in that area. For example, John H. Keating, vice president of manufacturing, Monarch Aluminum Mfg. Co., Cleveland, says the company had to assign a special maintenance man to watch their new continuous melting furnace.

At a recent meeting of the American Society of Mechanical Engineers, N. K. Conrad, superintendent of general maintenance at Ford Motor Co.'s Cleveland Engine Plant No. 1, put it this way:

"In the past, maintenance headquarters were located in one central area with most of the trouble calls coming to that point. Experience soon showed this to be a costly manner in which to operate this type plant. We found our skilled trades demanding a higher degree of versatility than we could acquire without many more years of experience and training. This was due to the complexity of the equipment, plus the different types of machine tools and varied operations.

"We also found," he continued, "that the waiting period from the time the machinery or equipment went down to the time the repairman reached the scene was excessive, thus raising costs of that department . . . therefore, instead of having one central shop . . . we have divided our plant into five 'productive maintenance' areas."

Tinkerless—At the Cleveland engine plant, each of these areas has a full-fledged maintenance department. One man is responsible for all maintenance done in the area. He has foremen on each shift responsible to him. Hourly workers are assigned to each area foreman, including electricians, machine repairmen, hydraulic and pneumatic specialists, toolmakers

(jig and fixturemen) and sometimes a pipefitter and millwright.

Both supervision and hourly personnel are thoroughly acquainted with equipment in their area. Through constant surveillance, they soon determine which perishable parts must be stocked for special equipment and machines, along with standard maintenance stock.

Another sound reason for area crews: The operator is less apt to tinker. If something is out of adjustment and the maintenance man is in another part of the plant, an operator is likely to try to make the adjustment himself. If the maintenance man is only a few steps away, the operator probably won't waste time trying to fix anything—he'll let George do it. From a maintenance point of view, this is almost essential.

Preventive or Corrective? — There's a difference of opinion as to whether preventive maintenance is practical for automation.

One side holds that it never was more important. The idea of preventive maintenance is to adjust, repair and replace parts before breakdown.

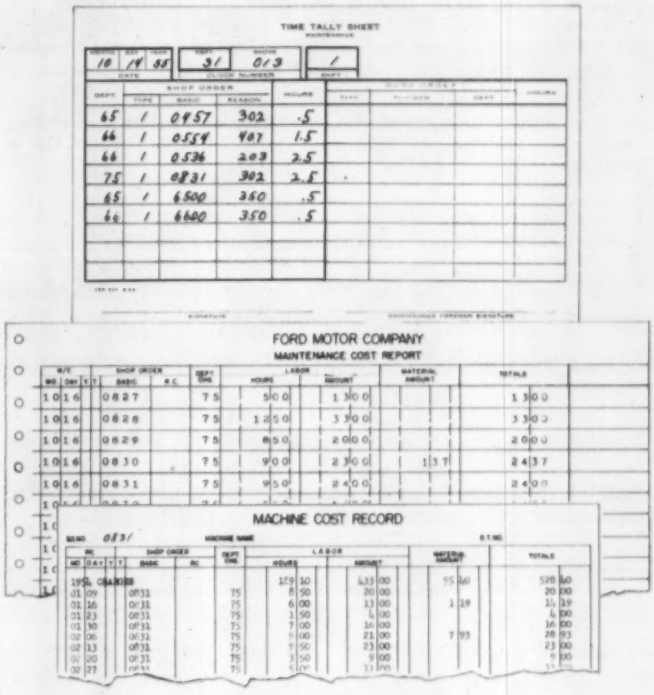
With automation, advocates point out, avoidance of breakdown is critical. Machines and equipment can be scheduled for minor overhaul at regular intervals.

The other side figures it is better to tolerate a few breakdowns than it is to spend excessively on preventive maintenance. They say that unless equipment gets into trouble, you can't afford to take it out of service.

Middle Ground — Probably the point of greatest return for most automated installations lies somewhere between these two points. If the equipment isn't in operation for a full three shifts, it may be possible to replace bearings, valves, motors, etc., while the equipment is idle—and do so before failure.

If the equipment is going full tilt all three shifts, it becomes necessary to compromise between breakdown repair and interruption for preventive measures.

Certainly, maintenance personnel (and everybody else on the line) should be preventive minded.


TIME TALLY SHEET

DEPT.	SHOP ORDER TYPE	SHOP ORDER BASIC	SHOP ORDER REASON	HOURS
65	1	0457	302	.5
66	1	0559	407	1.5
66	1	0536	203	2.5
75	1	0831	302	2.5
65	1	6500	360	.5
66	1	6600	350	.5

FORD MOTOR COMPANY
MAINTENANCE COST REPORT

M/C NO.	DAY	T	SHOP ORDER BASIC	R.C.	DEPT. TIME	LABOR HOURS	LABOR AMOUNT	MATERIAL AMOUNT	TOTALS
10	16		0827		75	5 00	1 30 0		1 30 0
10	16		0828		75	1 25 0	3 30 0		3 30 0
10	16		0829		75	8 5 0	2 00 0		2 00 0
10	16		0830		75	9 00	2 30 0	1 37	2 4 37
10	16		0831		75	9 5 0	2 4 0 0		2 4 0 0

MACHINE COST RECORD

M/C NO. 0831 MACHINE NAME DEPT. NO.

M/C NO.	DAY	T	SHOP ORDER BASIC	R.C.	DEPT. TIME	LABOR HOURS	LABOR AMOUNT	MATERIAL AMOUNT	TOTALS
1952 CHARGES						129 30	433 00	95 60	528 60
01	09		0831		75	8 50	20 00		20 00
01	16		0831		75	6 00	13 00	1 29	14 29
01	23		0831		75	1 50	4 00		4 00
01	30		0831		75	7 00	16 00		16 00
02	06		0832		75	9 00	21 00	7 93	28 93
02	13		0831		75	9 50	23 00		23 00
02	20		0831		75	3 50	9 00		9 00
02	27		0831		75	2 [illegible]	11 00		11 00

THE MAINTENANCE cost control system at Ford Motor Co.'s Cleveland engine plant is regarded as intricate, accurate and essential by plant management.

Maintenance crews of four or more men are assigned to specific areas, including several departments. These teams handle all routine maintenance problems.

Maintenance men make a report every day, showing what work was done, where it was done, materials used, trouble encountered, etc. The information works its way through the system to Machine Cost Record Cards. They tell the expense story on each piece of equipment in the shop, week by week.

Here's how it works:

Hourly maintenance men assigned to production areas fill out these tally sheets. Information includes: Department in which work was done; type of work (for machine repair, for tooling, fixtures, etc.); code number of equipment; reason (taken from numbered check list of troubles); and time spent on the job. Section at right is for materials ordered or for rebuilding, erection, etc.

Information from daily tally sheets goes to IBM, is entered on a detailed cost run and then to this Transfer Posting Run. Sheet shows daily totals of work and material charges for each machine in a depatrment.

Machine record is then entered on cost record card. This shows cumulative costs for maintaining and servicing the equipment. Entries are made weekly. This information helps management spot equipment that's too expensive. It can be used in selecting equipment that is ready for replacement, and can aid selection of new equipment.

Seven Signposts for a Maintenance System

Put maintenance men on the production line where they can anticipate trouble. Keep them aware of equipment performance

Acquaint maintenance crews with new equipment before it's installed. Show them drawings or send them to the builder's plant for instruction

Adhere to rigid schedules on routine maintenance items, such as lubrication. Use preventive maintenance when possible

Standardize on systems and components to simplify maintenance and reduce stock of spare parts

Determine an adequate spare-parts inventory and keep it in stock for maintenance

Establish adequate maintenance cost records for long-run economy

Establish close communication between production and maintenance supervision

Danger signs like a noisy valve or hydraulic circuit, excessively hot bearings and part-time electrical quirks should be heeded. When the equipment goes down for, say, a routine tool change, the cause of the danger signs can be corrected, and little or no production time is lost.

Also, maintenance personnel should be in touch with quality control. At Ford, Cleveland, they watch quality control charts for signs of equipment failure.

Routine — Lubrication, tool change and routine inspection of working parts must be performed on a scheduled basis. These can be, and often are, handled by someone other than the regular maintenance crew.

In automated machining, operators take care of tool change. Tool control boards warn which tools are nearing the end of their life. When the machine is stopped, all tools that are approaching the end of their life are replaced at once.

Lubrication can be handled from a central plant maintenance department or by area crews. Lubrication personnel should be given charts that show which points on the equipment require service, how often they should be lubricated, and what lubricant should be used. In many cases, it's essential to furnish the man with a checklist so he can check off points as he makes his rounds.

This load has been lightened by application of centralized lubrication to all critical points.

Records — Complexity of the maintenance operation varies directly with the complexity of production. Accurate records of repairs made are essential to long-run maintenance economy.

Records should show how much time is spent repairing a piece of equipment, what replacement parts are needed, nature of the trouble, etc. These records are no help in getting the immediate maintenance job done. They *are,* in a sense, preventive maintenance (see illustration for summary of one system).

Properly used, these records will show which equipment is susceptible to casualty, and what kind of trouble occurs most frequently. The records will put the spotlight on equipment that's out of line, cost-wise, will serve as a guide to stocking spare parts and will influence assignment of personnel to the maintenance crew.

People—At the beginning of the automation boom, many prognosticators said plants eventually would be maintained by a staff of engineers and technicians. They hinted that a Ph.D. wouldn't feel out of place on maintenance crews.

This isn't true—at least, for now. Most experience shows that a good maintenance man before automation is a good maintenance man now. There are two differences: The first is his method of operation; attribute that to the system. The second is his job; specialization spells this change.

It's a rare bird that's qualified to be *the* maintenance man on an automation line. The all-round maintenance man, like the family doctor, is disappearing from the American scene. Today's maintenance man is being trained to diagnose and treat specialized ills of the hydraulic system, or the electrical network, or the tooling.

At the 1954 Production Machine Tool Hydraulic Forum, Gregory McKeown, product service manager, Vickers Inc., said: "Only trained specialists should be used for hydraulic maintenance work. Anyone charged with maintaining hydraulic equipment should be familiar, not only with the functions of the hydraulic units but also with the degree of precision which must be retained in hydraulic equipment to provide satisfactory performance."

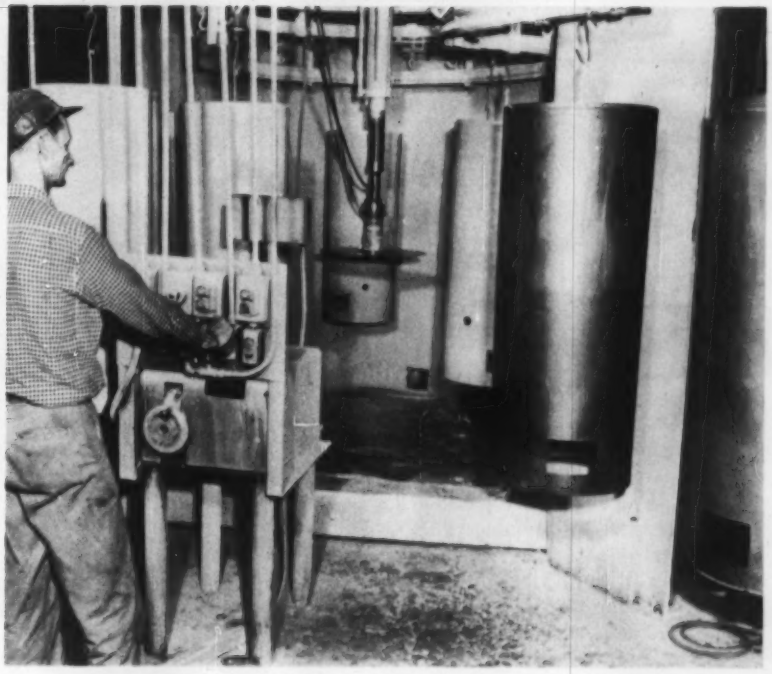
Training—How do you educate your maintenance men for automation? The automobile companies, and others with a similar stake in automation, are spending thousands to train maintenance crews in electrical troubleshooting, hydraulic and pneumatic circuitry, mechanics and electronics. Other companies are sponsoring courses in these subjects at local night classes.

One of the easiest, and most effective, methods is to make use of the equipment builders. Osborn Mfg. Co., Cleveland builder of foundry automation, has customers' men come to their plant to talk with their engineers and to learn about the equipment, even before it's installed. It's a good rule to have your maintenance men sit down with the prints and drawings to learn what circuits control what functions. This will bring big dividends, particularly in the run-in stages when bugs are worked out of the equipment.

Water heater jackets, revolving around this electrostatic painting disc, get . . .

Better Finishes at Lower Cost

By THOMAS I. MASTIN
Chief Engineer
M. M. Hedges Mfg. Co. Inc.
Chattanooga, Tenn.



PAINTING PRODUCTION of water heater jackets has tripled since we put in an electrostatic spray system and new conveying equipment. Finish is improved and paint mileage has gone up from five to twelve jackets per gallon.

The M. M. Hedges Mfg. Co. makes automatic gas and electric water heaters in round and table top models. Sizes range from 10 to 100-gallon capacities. Most popular model is a 30-gallon gas unit.

Before—When jackets were finished by hand spray, our paint department was getting five jackets per gallon of enamel. Later, we went to the Ransburgh No. 1 process of electrostatic spray painting (it uses spray guns) and paint mileage went up to eight jackets per gallon.

Then we replaced the No. 1 with the Ransburgh No. 2 reciprocating disc. Now we are coating 12 jackets with each gallon of paint.

Paint Line—A 500-ft long conveyor, operating at 6 fpm, carries the 30-gallon heater jackets from the fabrication area. They hang on the line on 30-in. centers.

After a three-stage bath (Oakite No. 89, water rinse and chromic acid), the jackets go through a drier and a blow-off station before entering the electrostatic paint area.

Paint Feed — The conveyor makes a loop around the reciprocating disc atomizer which is mounted overhead. Paint is pumped to the center of the disc (25 in. in diameter) which rotates rapidly to feed enamel to the atomizing edge.

A high, direct-current voltage potential on the disc establishes an electrostatic field between the disc and the electrically grounded jackets on the conveyor.

No Dirt—The electrostatic field atomizes the paint into a fine spray, and it is attracted to the surrounding parts. Since no compressed air is used, we eliminate the dirt and dust problem previously caused by high pressure air blasts.

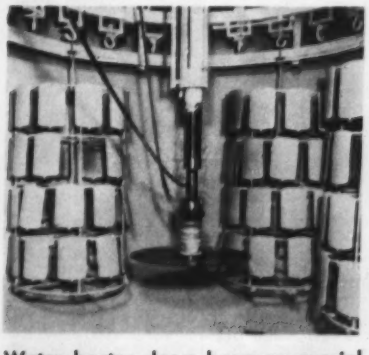
The reciprocator makes 7½-strokes a minute on the 30-gallon jacket which is 48 in. long. The multiple strokes of the disc permit a uniform coating to be applied in a single loop. The jackets rotate on the conveyor as they move around in the spray area.

Small Parts — Length of the stroke is adjustable for different size parts. When painting small parts, such as heater doors, we hang as many as 40 pieces on special workholders. In painting the sides for table models, we hang four panels to a fixture. An indexer in the center of the paint area turns the holder 180 degrees, permitting painting of both sides in the single loop.

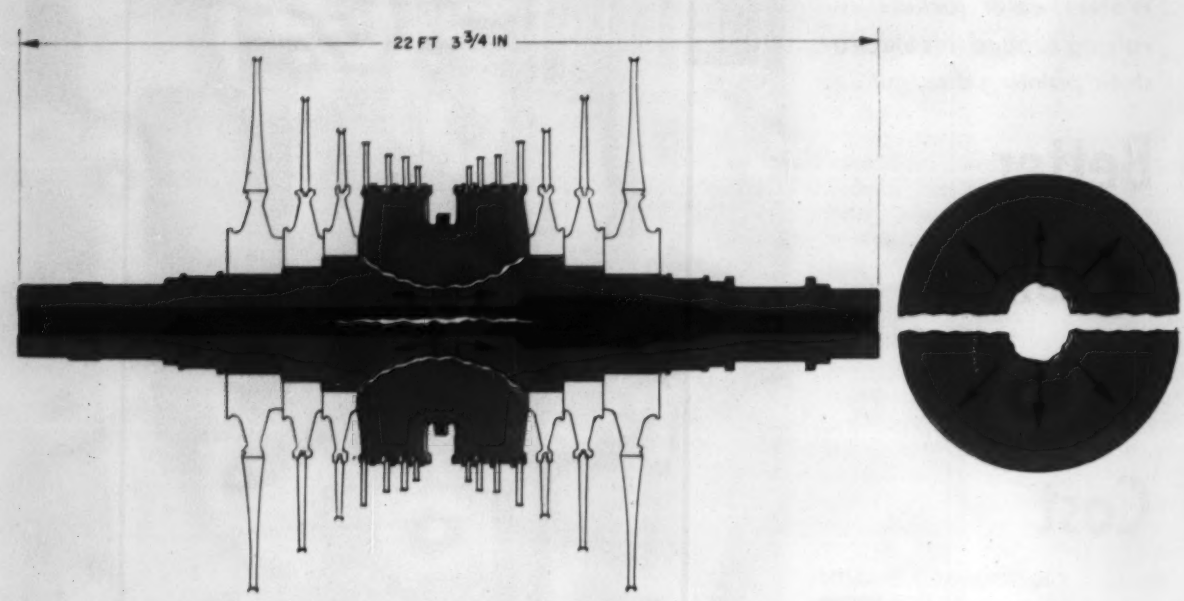
Hedges water heaters are painted in four colors: White, maroon, black and gray. Color changes are made in minutes.

Daily Schedule — Painting is scheduled according to daily demands in assembly. This minimizes banking of finished parts.

From the paint area, parts move into the infrared ovens where they bake out for 9 minutes at 325°F.



Water heater doors hang on special workholders. Fixtures rotate as the conveyor makes a loop around the reciprocating disc



How the spindle split

Why the Forging Failed

"IF WE HAD KNOWN then what we know now, the turbine never would have blown up." That is essentially what Allis-Chalmers told the ASME in its recent report on the disaster that shook Chicago a year ago.

Shortly before midnight on Dec. 19, 1954, a low-pressure turbine spindle shaft let go at Commonwealth Edison Co.'s Richmond station, killing two, injuring five and plunging a large part of the city into darkness. There was no warning. The steam turbine was undergoing a routine overspeed-trip test.

The turbine had been made by Allis-Chalmers Mfg. Co. But in telling about it, that company was speaking for all large turbine and forging makers, who share common problems.

Hydrogen—The finger points directly at hydrogen embrittlement as the cause of failure. Warning signs were visible in 1951 when the forging was made—if anyone had had the wisdom to interpret them. But indications spotted in ultrasonic tests were put down as harmless inclusions and stringers, a reasonable conclusion for the state of testing knowledge at the time.

It's a relief to know that modern testing can prevent similar disasters: The same forging

Microstructure of typical crack near mid-radius of the forging

Four fracture segments reassembled. Note the central conical fractures

would be rejected today on ultrasonic evidence. Not long after the Richland turbine was constructed, Allis-Chalmers began requiring ultrasonic tests for acceptance of all forging ingots.

Evidence—That hydrogen was to blame in this case shows up clearly in the evidence, says Allis-Chalmers. Here is how it reconstructed the picture.

The spindle was conventional, with a central section of large diameter carrying the high pressure blading. The lower pressure blading was carried on rings which were shrink fitted on either side of the central section. Factors of safety conformed to widely accepted standards.

Physicals—The shaft was made of nickel - molybdenum - vanadium steel, with these properties:

Chemical analysis:

Carbon	0.25-0.35 per cent
Nickel	2.50-3.50
Chromium	0.25-0.75
Molybdenum	0.40-0.60
Vanadium	0.05 min

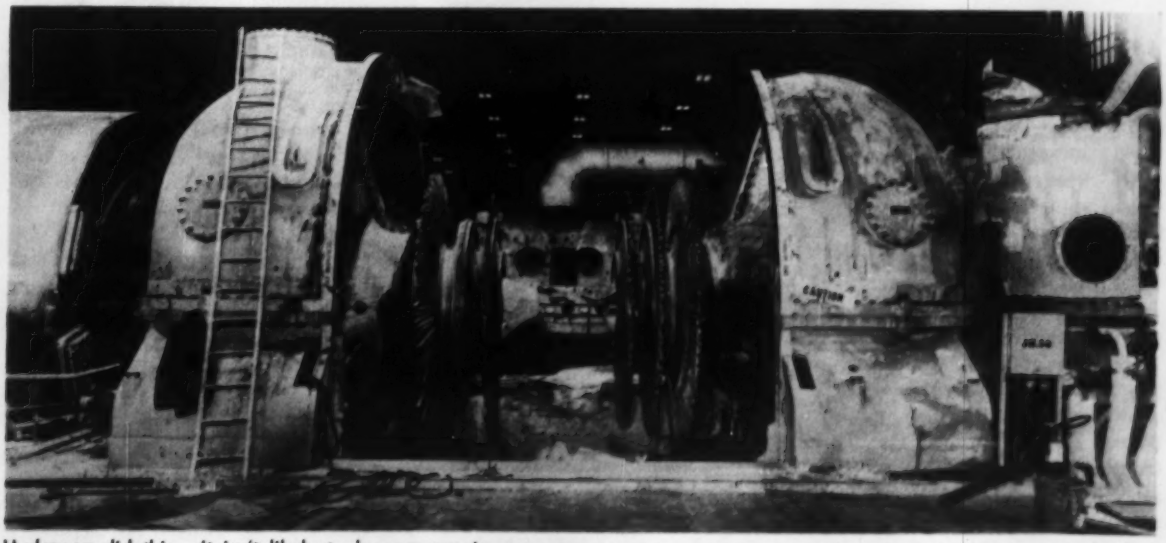
Physical properties:

Tensile strength	105,000 psi
Yield strength (0.02 per cent)	85,000 psi
Elongation in 2 in.	16 per cent longitudinal 12 per cent transverse or radial
Reduction of area	30 per cent longitudinal 23 per cent transverse or radial

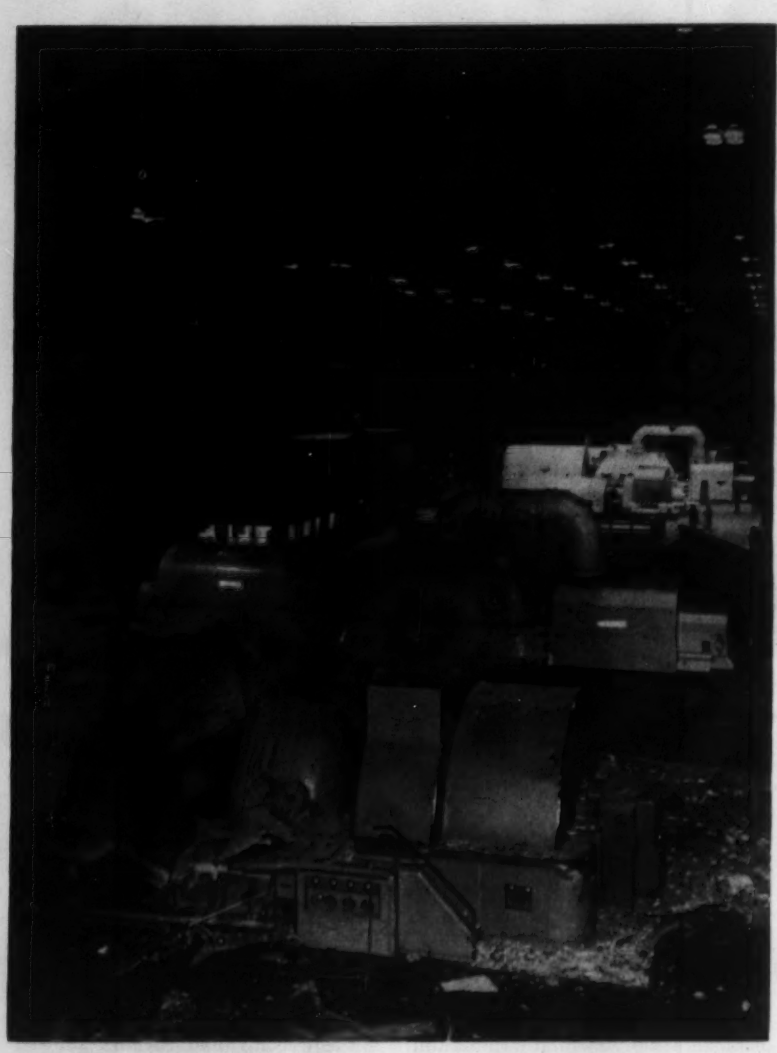
Manufacture—The 186-ton ingot was reduced by forging in the ratio of 1.4 to 1 before upsetting, and after forging was given a 470-hour flake or thermal-crack protection cycle. After rough machining and boring, the shaft was normalized and tempered.

Inspection included heat indication, dimensional inspection, sulphur prints, magnetic particle inspection and visual inspection of the bore. Both the forging manufacturer and Allis-Chalmers made ultrasonic inspections, but for information only.

Visual inspection spotted discontinuities in the bore, but they were machined away. Sonic tests showed indications in a neighboring area, but because of the satisfactory visual bore condition, processing was continued. Tests on the completed turbine showed



Hydrogen did this. It isn't likely to happen again



The turbine after the accident

the shaft to be more than usually stable and vibration-free.

Blow-Up—The accident occurred when the central portion of the shaft (between the shrunk-on rings) split into four almost identical quarters. At their bases, the quadrants separated from the shaft by conical fractures extending inward from the fillet at the edge of the innermost ring.

Rupture started in an area of the shaft near the bore which showed an abundance of hydrogen flakes, and progressed by brittle fracture. It definitely did not start at the ring fillet, although that area showed a good-sized crack.

Evidence — Chemical analysis by Battelle Memorial Institute showed a hydrogen content of only about 1 ppm, normally considered satisfactory, but physical tests modified this picture. Low values for elongation and reduction of area near the bore indicated considerable loss in ductility.

Most significant, some test bar fractures showed "fish eyes," bright spots resulting from hydrogen concentration. Test bars from areas of low ductility showed fully restored ductility after baking for two hours at 400°F, indicating that excess hydrogen in the metal had been removed by heating.

Charpy V-notch impact tests indicated a probability of high notch sensitivity and brittle rather than ductile failure under conditions of multiaxial stress.

Fracture Prone—Failure of one turbine is the concern of all makers because most standard materials for big turbine spindles and generator rotors are notch sensitive and capable of brittle failure at normal operating temperatures and speeds. Great care must be taken to eliminate notches that might lead to brittle fracture.

But hydrogen, trapped in solidifying steel, creates hidden notch weakness (flakes, thermal cracks, segregation cracks). These flakes tend to be oriented radially in cylindrical forgings, and thus to be edge-on to sound waves projected from the circumference. Five years ago, that wasn't so well understood in ultrasonic testing.

Way Out—What's the answer? Austenitic steels and nonferrous metals that are immune to brittle failure have been proposed for turbine shafts. They've been ruled out for low strength or other undesirable qualities.

The probable solution will come from new steel compositions, better heat treating and improved steelmaking practice especially. The process developed by Bochumer Verein AG in Germany for vacuum casting ingots looks like the best bet at the moment. It has been used to cast hydrogen-free steel for turbine shafts for several years in Europe and is about to be introduced in the U. S. by National Research Corp. (STEEL, Nov. 14, 1955, p. 120).

Along with better materials will come better inspection methods. Coming are sonic techniques for searching from the bore outward. Most needed are sure-fire methods that will distinguish between harmless and harmful indications. A step in that direction is better understanding of the roles that pattern and distribution of indications play.

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

WEIGH FIRST COSTS

of CMP restricted specification cold rolled strip steel

True costs of cold rolled strip steel are oftentimes clouded by unfamiliarity of the full potential with a specially tailored product such as CMP processes.

Typical of the reductions in overall manufacturing costs that can often be recorded with the use of CMP restricted specification strip, is the elimination of manual costs involved in the tear-down and re-assembly of components rejected for malfunctioning due to steel dimensional variations. Where precision fitting of components is essential to satisfactory equipment operation, the extra steel cost for close gauge accuracy is more than offset by greater parts production per machine hour and reduction or elimination of rejects at final assembly. Add to this the lower end product cost resulting from longer tool life, fewer coil changes on production equipment and other labor cost items.

The conclusion often is that it pays to buy a premium specification product to lower the cost of an end product employing cold rolled carbon, alloy or stainless strip steel.

CMP
WHERE YOU CAN GET SPECIFIC SPECS. FOR SPECIFIC JOBS

LOW CARBON
HIGH CARBON
Annealed or Tempered
STAINLESS
ALLOY
ELECTRO ZINC COATED

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GENERAL OFFICES: YOUNGSTOWN 1, OHIO

PLANTS: YOUNGSTOWN, OHIO AND INDIANAPOLIS, IND.
SALES OFFICES: New York • Cleveland • Detroit • Indianapolis
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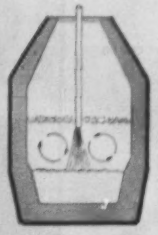
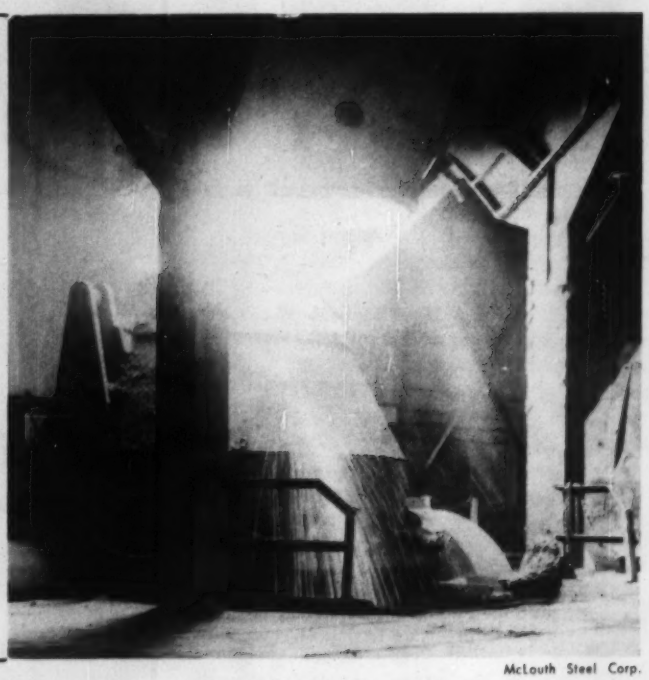


Jones & Laughlin Steel Corp. will install two oxygen blown converters at Aliquippa, Pa. This move by the No. 4 producer is prompting steelmaking management to take another look at the . . .



McLouth Steel Corp.

Economics of Oxygen Steelmaking

HOW do the costs of oxygen and open-hearth steelmaking compare?

Some figures were given by George B. McMeans, vice president-operations, Kaiser Steel Corp., at the San Francisco regional technical meeting of American Iron & Steel Institute, last month.

Investment: One-Half—An oxygen converter plant can be built for a capital expenditure of less than half the cost of open-hearth facility of equal capacity, according to Mr. McMeans.

For example, an oxygen shop that turns out 450,000 tons per year can be built for under $10 million. This includes two 35-ton vessels (one operating and one stand-by), all operating equipment, utilities, storage facilities and a system for air pollution control.

An open-hearth shop of only slightly larger capacity (525,000 tons, using 275-ton furnaces) would cost $21 million, said Mr. McMeans.

The capital outlay differential increases if shops of greater capacity are built. He estimated that an oxygen shop for close to a million tons a year could be constructed for about one-third the cost of a comparable open-hearth plant.

For a time, there was considerable concern about air pollution. Kaiser Engineers (it holds U. S. licensing rights on the oxygen process) guarantees that stack emission from an oxygen converter will be no greater than that from a modern open hearth equipped with a precipitator.

Production Costs? — These also favor the oxygen process, according to Mr. McMeans.

Materials used by the oxygen converter may cost a little more, but the difference is less than $1 per ton.

Savings come in labor, maintenance and other cost items (about $3 a ton, Mr. McMeans said).

How It Works—The converter vessel may be either eccentric or concentric—both types are used. It resembles a bessemer, although there are no tuyeres, wind box or blast pipe.

The refractory lining is about

PREDICTION

What is the future of oxygen steelmaking in this country? In an interview with STEEL's editor, Irwin Such, in Zurich, Switzerland, this summer, Werner Schlaepfer, manager, Brassert Oxygen Technik, had this to say:

"In the new expansion program in the U. S., at least one-third will be oxygen converter steel. But BOT is not a universal process . . . It's limited to steel with 0.35 max carbon at the moment . . ."

*. . . this 285-ton Pollock Open Hearth Ladle is welded on a special positioner designed specifically for jobs like this. The ladle is placed on the rollers and revolved until the ladle is in the best possible position for "down-welding." Using the positioner results in better welds. A positioner for a 285-ton ladle is big . . . it has to be. But at Pollock, where thinking is as big as the job itself, huge machines are commonplace.

The William B. Pollock Company prides itself on being able to do the big jobs. It has the skilled men, the resourceful engineers and the special machines (as this positioner) that are needed to turn your biggest drawing board dreams for iron and steel making facilities into solid, practical realities. When you're thinking "big," think of The William B. Pollock Company . . . specialists in all matters and equipment pertaining to the manufacture of iron and steel.

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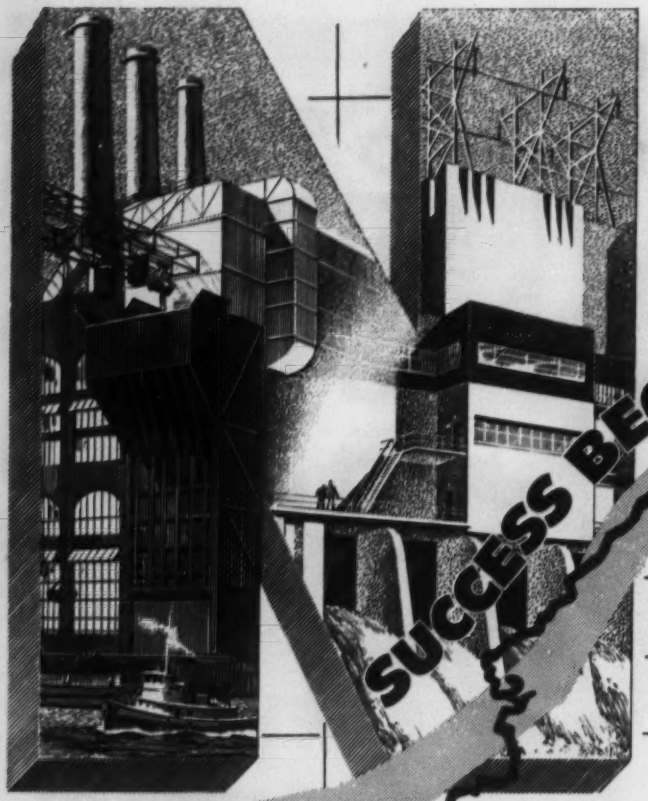
BLAST FURNACES • HOT METAL CARS AND LADLES • CINDER AND SLAG CARS • INGOT MOULD CARS • CHARGING BOX CARS • WELDED OPEN HEARTH LADLES



SUCCESS BEGETS SUCCESS

Development of power resources marches forward where the demand for power exists. More power is now generated and consumed in New York State than in any other. Enormous new power resources—thermal, hydro-electric and nuclear—are in course of development. Another reason why more industries—and a greater variety of industries—operate at a profit in New York State than in any other. A good reason for locating your plant in the Empire State.

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NEW YORK STATE

AVERELL HARRIMAN
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Commissioner of Commerce

20 in. thick. At first, it consisted of a permanent lining of magnesite brick and an interior lining of pressed tar—dolomite brick with a layer of tar-dolomite between the permanent and interior linings.

A lining life of 120 heats was normal. This has been extended to about 400 heats per lining by use of burned magnesite brick instead of tar-dolomite. A vessel is in continuous production for about ten days before being taken off for relining.

Ton a Minute — Mr. McMeans gave a yield of 89 per cent as about average. In a 400-ton vessel, the blowing period runs from 20 to 22 minutes. This gives a complete tap-to-tap cycle of between 35 and 40 minutes and means that a 40-ton vessel will turn out between 50 and 60 tons per hour.

Oxygen used in the process averages about 2000 cu ft per ton of steel.

Start Here—Charging is similar to regular converter practice and begins with the vessel being tilted to take scrap (about 25 per cent of all metal used). Werner Schlaepfer, manager, BOT, Zurich, Switzerland, reports that as little as 8 per cent scrap can be used.

This is followed by hot metal and small quantities of roll scale and lime.

The vessel then goes upright and a water-cooled oxygen lance is lowered to between 2 to 3 ft above the surface of the bath. Oxygen is turned on—pressure is about 100 to 150 psi.

An immediate reaction starts. Iron oxide (FeO) is formed—part goes into the slag and some diffuses into the bath. A vigorous carbon monoxide boil reaches all parts of the charge. This helps mix the FeO with the bath.

High Temperature—In the central reaction zone, temperatures are close to the boiling point of iron. This enhances the solubility of oxygen and accelerates the diffusion rate of FeO throughout the bath. The converter takes out 50 to 60 per cent of the sulphur, which is expelled as sulphur dioxide.

A slag high in FeO is formed over the surface of the bath, which acts as a seal. The carbon reaction speedily diminishes the FeO content of the slag.

A drop in the flame at the vessel mouth shows that the process is finished. At this point the oxygen lance is withdrawn. The vessel is tilted to the horizontal and slag is skimmed off. Then it is tipped another 10 degrees to pour the metal into a regular ladle.

Clean Steel — Continuation of boiling to the last minute of the refining period prevents overoxidation. It does away with the need for deoxidation with its pickup of impurities in the ladle. The vigorous boiling action coming from extreme fluidity of the molten steel results in less gas being retained in the ingot—the center and bottom parts of the ingot always have excellent density. These were reasons given by Mr. McMeans for the high degree of purity of oxygen steel.

While the hot formability of oxygen steel compares well with open-hearth product, its cold working properties are better. High ductility makes it especially suited to the manufacture of cold drawn wire and cold rolled strip and sheets.

According to Mr. McMeans, oxygen converter steel never shows any trace of pickle blisters even under the most severe conditions —more proof of its high purity.

Future—When it comes to high-carbon steels and some of the specialized alloys, Mr. McMeans said that we will have to rely upon the open hearth and electric furnaces. Here's the way he put it: "The oxygen process is not ready to replace the open-hearth — complement it, yes; but supplant it, no —at least not for a long while."

The oxygen process will stimulate work on new hot metal processes. Because of its low-cost features, it's a natural for the small nonintegrated steel plant. Yet it cannot be used due to the hot metal requirement.

Mr. McMeans predicts we will soon see companion evolutionary developments in hot metal refining to eliminate blast furnace and coke oven facilities. "This may take the form of direct reduction, continuous cupola or even some entirely new approach—but it will come," he says.

In steelmaking . . .

Research Keeps Technology Alive

Electron microscope probes metal structures at 50,000 magnifications

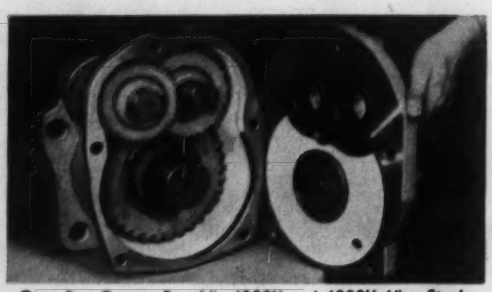
"I KNOW of no industrial research organization in the country that does not plan continued expansion. We certainly do."

Those words were used by Dr. Howard S. Turner, vice president-research and development, Jones & Laughlin Steel Corp., at the dedication of the corporation's Graham laboratory in Pittsburgh.

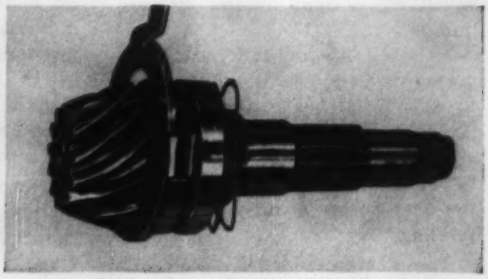
Dr. Turner said that J & L, in the main, will expand its research of basic processes — preparation and processing of raw materials, smelting and refining.

Upgraded Ores — Reduced reserves of high quality ores have required enormous processing installations to turn out the quality of ferrous raw materials needed

How you can put hundreds of

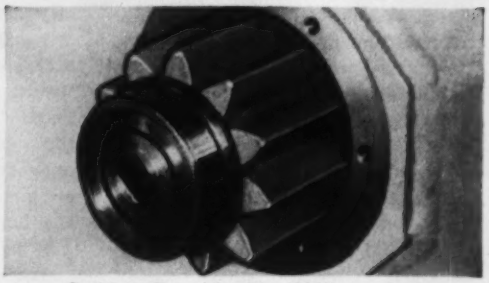


Gear Box Gears—Republic 4320H and 4820H Alloy Steels



Transfer Case Pinion—Republic 4820H Alloy Steel

Transfer Case Ring Gear—Republic 4820H Alloy Steel



Final Drive Pinion—Republic 4820H Alloy Steel

horsepower to work with safety

LeTourneau-Westinghouse does it with the help of Republic Alloy Steels on the Model B Tournapull. This high-speed, self-propelled scraper is designed to carry 23 yards of earth at speeds up to 28 miles per hour.

Republic Alloy Steels are used in this giant for final drive pinions, transfer case ring gear and pinion, gear reduction box gears and pinions, and electric motor pinions.

Alloy steels provide an outstanding combination of qualities essential to safety in designing equipment to carry heavier loads at higher speeds. In these fine steels you will find highest strength values—plus an unusually high strength-to-weight ratio that permits transmission of hundreds of horsepower through tough, strong gears and shafts free from excessive weight.

And when you add to these qualities uniform hardness, that means reduced wear—plus resistance to fatigue, shock, stress and temperature extremes—you have a material with the ability to insure safety, extend equipment life, and to cut maintenance and replacement costs.

Republic—world's largest producer of alloy steels—is ready to assist you with metallurgical and engineering assistance in the most efficient and economical application of these fine steels to your product. The coupon will bring you more information.

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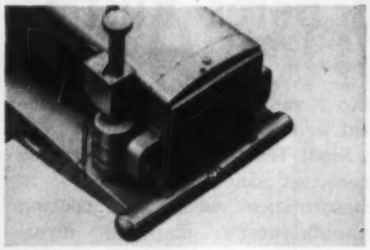
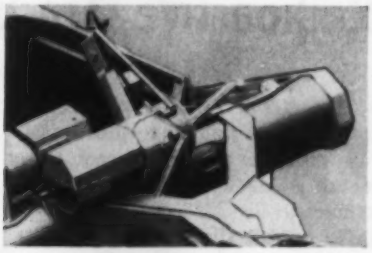
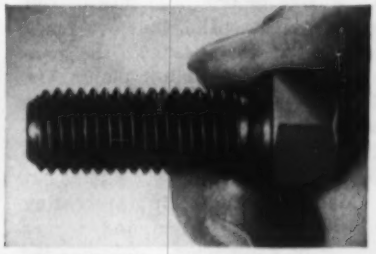
World's Widest Range of Standard Steels and Steel Products



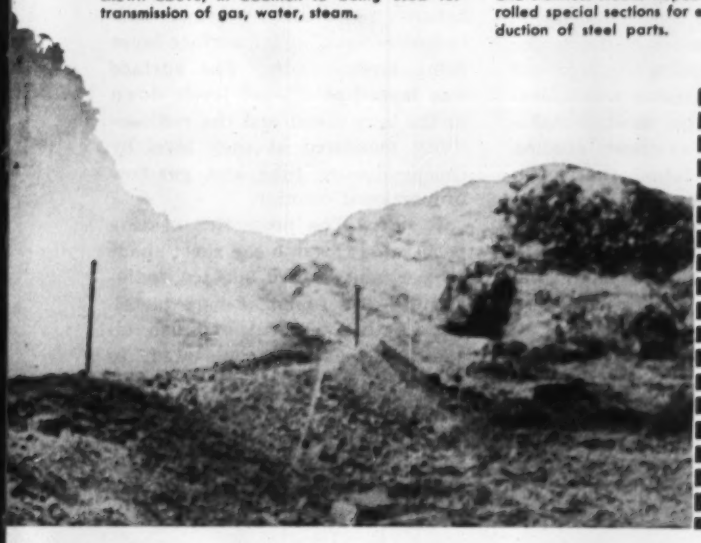
ANOTHER REPUBLIC PRODUCT, Electric Resistance Weld Steel Pipe, is used for the front bumper on the Model B Tournapull. Both this type and Continuous Butt Weld Steel Pipe have been serving industry for years in all types of applications. Today they are better than ever. They have many mechanical applications, like the one shown above, in addition to being used for transmission of gas, water, steam.



PINS, BRACES AND REINFORCEMENTS on the Model B Tournapull are made from Republic Hot Rolled Carbon Bars. Countless forging and general manufacturing companies look to Republic as a dependable source for hot rolled steel bars. Rounds, squares, hexagons, octagons and flats are produced in all grades of carbon, alloy and stainless steels. Republic also supplies hot rolled special sections for economical mass production of steel parts.



REPUBLIC COLD FINISHED CARBON BARS are used by LeTourneau-Westinghouse for cap screws and bolts. Cold drawing gives steel parts higher strength, greater uniformity and a bright, smooth finish. Republic's Union Drawn Division supplies high-quality cold finished bars in all standard and special carbon, alloy and stainless analyses. And to get the most out of these steels, Republic offers you the services of expert metallurgists and machining specialists.



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for the blast furnace. J & L pioneered with the first large-scale beneficiation of lean iron ore in this country, Dr. Turner stated, adding:

"But new technologies demand our attention as the pressure for upgrading these raw materials grows. We will certainly see more great advances in the future."

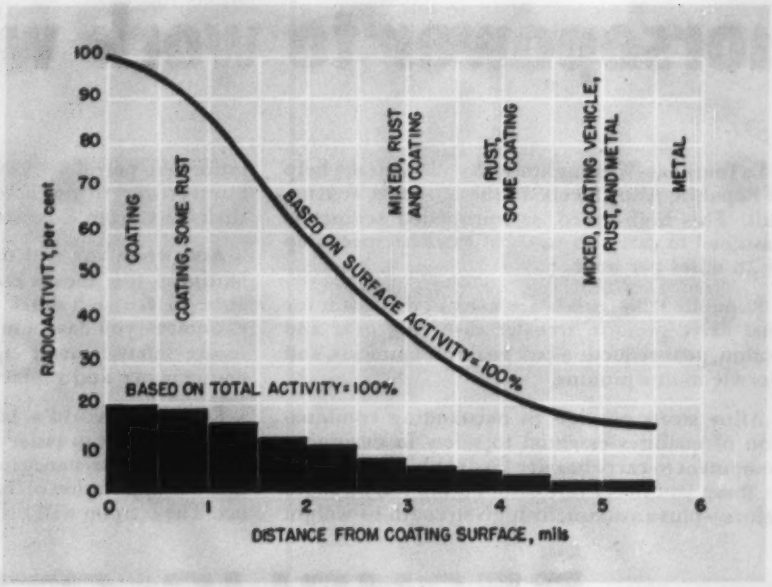
Change in Coke—He predicted: Some day, the conventional coke oven may give way to a continuous process to provide the carbonaceous feed for the blast furnace. This will match the parallel processing of ores by enhancing control of the size and quality of the blast furnace burden.

One of the steel industry's aims in processing, according to Dr. Turner, is to gain a better understanding of mass and heat flow . . . and reaction kinetics in the kilns, shafts and vessels in which raw materials are converted to steel.

Translate—To put the increased knowledge of our processes to full use, it is essential that we learn to adapt research data to the massive installations in our plants, Dr. Turner explained. "Probably no single factor restricts the application of new basic knowledge so much."

Many advances in processing have been in larger and larger pieces of equipment. This has led to something of a financial dilemma, Dr. Turner pointed out. There is less opportunity for the incremental addition to capacity. Expansion must be in relatively enormous bites if it is to be economical. The appetite for capital in the steel industry is tremendous by any measure, but it would be more manageable if it were possible for us to reduce the size of our fully economic units of processing, he believes.

Keep Competitive—He summed up: "With no let up in the technical effort, we are aiming toward our customer needs, we expect to broaden and intensify research directed toward cost and quality improvement in our basic processing steps. We see this as essential, since the steel industry is under heavy competitive pressure not only within its own family, but from without—from lighter metals and plastics."



Composite curve of four test specimens shows the penetration into the rust layers of the radioactive vehicle component of the primer coating. Per cent of radioactivity in each 0.5 mil layer is given in the bar graph

Radioactive Tracing Bares Rust

A MANUFACTURER of protective coatings wanted to prove that his product penetrated to bare metal when applied over rusted surfaces.

He turned the problem over to technologists at Battelle Memorial Institute who came up with the means—radioactive tracing. A constituent of the fish-oil-based coating was made radioactive and then traced down to the bare metal.

How—First, it was necessary to identify one or more of the major chemical constituents of the primer coating and determine which constituent would be most suitable for radio tracer synthesis studies.

Technologists found that glycerol in the form of triglycerides was a major constituent of the coating and common to all fish oils.

Radioactivated — Glycerol was synthesized, using radioactive carbon-14. The glycerol portion of the fish oil was then replaced with the C^{14}-labeled glycerol.

The reconstituted fish oil was tested to make sure it was identical with the original oil. It was then processed by the manufacturer (Rust-Oleum Corp., Evanston, Ill.) into a radioactive coating equivalent to the standard product.

Final Tests—Seven badly rusted steel test panels were prepared in conformance with the coating manufacturer's standard directions for application. The radioactive primer was then brushed on directly over the rusted surfaces and allowed to dry for two weeks.

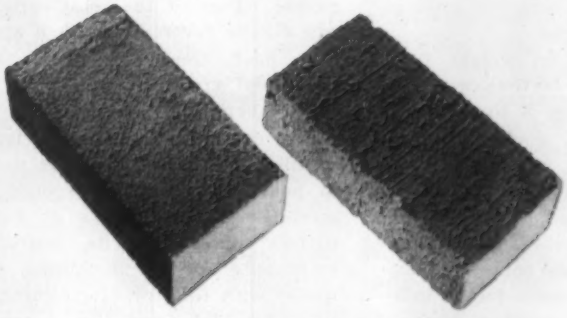
Following this period, the coated panels were put in a lapping fixture that made possible controlled removal of the surface layer using crocus cloth. The surface was lapped at 0.5 mil levels down to the bare metal and the radioactivity measured at each level by Geiger-Mueller tube and gas-flow proportional counter.

Results—The protective coating penetrated through the rust; about 15 per cent of the surface radioactivity was found at bare metal. The coating pigment and fish oil vehicle combined penetrated to about 4.5 mils in depth.

Results also show the unusual affinity which fish oil has for rust. Radioactivity was recorded even where rust had formed in deep pits or pockets in the metal.

Cork Burn-Out...

increases strength and lengthens life of Armstrong Insulating Fire Brick



Fine-grained, even texture of Armstrong Insulating Fire Brick on left gives brick high insulating value.

When brick are fired, cork particles burn out slowly and evenly, eliminating laminations and internal strain. The result of this exclusive Armstrong process is a strong, durable brick, easy to handle and requiring less frequent replacement in service. Cork burn-out allows this extra strength to be obtained without sacrifice in insulating efficiency.

Write for free booklet giving full information on the entire line of Armstrong Insulating Refractories. Address Armstrong Cork Company, 2711 Reed Avenue, Lancaster, Pennsylvania. If you have a problem involving the use of insulating refractories, call in your Armstrong Engineer for expert assistance.

Armstrong INSULATING REFRACTORIES

No. 20 in STEEL's Modern Heat Treating Series

Heat Treating Ductile Iron

PART I

By Dr. ROBERT E. SAVAGE
Metallurgist, Development and Research Division
International Nickel Co. Inc.
New York

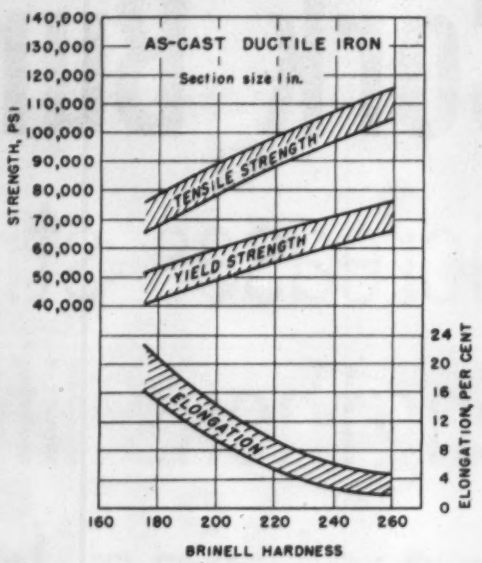


Fig. 1—Range of mechanical properties of sound, carbide-free castings in the as-cast condition

A DUCTILE IRON casting can be heat treated to a remarkable range of mechanical properties. They vary from 60,000 to 200,000 psi tensile strength, with up to 25 per cent elongation.

Heat treatments commercially used on ductile iron are stress relief, softening (annealing), hardening (normalizing, quenching, austempering and martempering, all followed by tempering) and surface hardening (induction or flame hardening).

This article will deal with stress relief and softening heat treatments, Part II, to appear next week, will cover hardening and surface hardening.

Mechanical Properties — Ductile iron, also called nodular iron, is a cast iron with the graphite substantially in spheroidal form. Its wide variation in mechanical properties is influenced primarily by heat treatment and secondarily by chemical composition.

Ductile iron is a family of magnesium-containing cast irons which may have wide variations in chemical composition. Most commercial castings with which this article deals fall within the range of:

Total carbon—3.0-4.0 per cent
Silicon—2.0-3.0 per cent
Manganese—0.2-1.0 per cent
Phosphorus—0.1 maximum
Sulphur—0.02 maximum
Nickel—0.0-3.0 per cent
Iron—87.0 per cent minimum

Alloying Elements—Ductile iron must contain small percentages of magnesium. In ordinary foundry practice 0.05 per cent will produce spheroidal graphite.

Castings vary in weight from several ounces to 50 tons, with sections ranging from ⅛ to 48 in. Alloying elements, such as nickel and molybdenum, are added to impart hardenability or otherwise improve properties.

Carbon Content—The distribution of total carbon content in ductile iron is the main factor influencing its mechanical properties. Carbon is essentially present as uncombined carbon (spheroidal graphite), but the iron may contain some combined carbon in the iron matrix (massive carbide, pearlite or martensite).

The proportion of uncombined carbon to combined carbon may be accurately controlled by heat treatment to produce Brinell hardnesses from 140 to 600. In most cases, the control is a reversible process; the same casting may be softened for ease of machinability and then hardened for higher mechanical properties and improved wear resistance.

Steel-Like Matrix—Think of ductile iron as a material containing spheroidal graphite in a steel-like matrix. The matrix consists of an iron phase rich in silicon and manganese. Part of the total carbon will diffuse reversibly with a specific heat treatment from the spheroidal graphite to the matrix or vice versa.

You can heat treat ductile iron by all conventional methods used to heat treat steel to produce a steel-like matrix of low or high carbon content (ferrite, pearlite, martensite or combinations of these) with the graphite retaining its spheroidal form. In general, alloying elements which impart hardenability to steel do the same for ductile iron.

As-Cast—Properties and microstructure of ductile iron as cast will vary with its section size, since it affects the cooling rates. After proper heat treatment, the matrix structure will be independent of section size.

Typical properties of as-cast ductile iron are: Tensile strength, 80,000 to 110,000 psi; yield strength, 60,000 to 75,000 psi;

elongation, 3 to 10 per cent in 2 in.; Brinell hardness, 200 to 270; Charpy impact unnotched, 15 to 65 ft-lb.

Section Size — All ductile iron castings will contain spheroidal graphite. However, the matrix may vary gradually from partially carbidic with pearlite in light sections (less than about ¼-in.), through pearlitic in moderate sections (¼ to ¾-in.), to pearlitic-ferritic mixtures and finally ferritic in heavier sections (¾-in. and over).

It is possible to have combinations of these microconstituents in a casting of varying section size. It is not possible to give definite section sizes where these changes occur, since chemical composition influences the matrix as well as prior foundry treatment.

Chemistry—Ferrite forming elements, such as silicon, promote ferrite in the lighter sections and decrease the tendency to form carbide and pearlite. On the other hand, pearlite or carbide forming elements, such as manganese, promote pearlite or carbide in the lighter sections and decrease the tendency to form ferrite. One element, nickel, does not fall into either category since it promotes pearlite and decreases the tendency to form both carbide and ferrite.

Thus, the mechanical properties of as-cast ductile iron in various sections may be controlled by its chemistry.

Properties — The range of mechanical properties of sound, carbide-free castings in the as-cast condition are shown in Fig. 1. A definite relationship exists between tensile strength, elongation and hardness of as-cast ductile iron. (The ratio of tensile strength to Brinell hardness is about 420:1.) This means that a simple hardness measurement on a casting will give a reasonable indication of mechanical properties, providing the casting is sound and free of primary carbide.

Stress Relief—Heat treatment of ductile iron for stress relief does not materially affect its microstructure or mechanical properties. It will remove any residual stresses in the casting caused by the casting process.

All complex engineering castings should be given a stress relief heat treatment.

Castings may be stress relieved at temperatures from 1000 to 1250°F. They should be held at temperature for 1 hour, plus 1 additional hour for each inch of section thickness.

Time-Temperature — The cooling rate from the stress relief temperature will not affect the microstructure or the mechanical properties. However, it may affect the retention of residual stresses in the casting and should be carried out at a slow rate to prevent setting up such stresses.

It is good practice to cool the casting in the furnace to about 700°F; however, the complexity of the casting is the controlling consideration in the determination of cooling rates (Fig. 2).

Softening—The annealing treatment for ductile iron castings consists of: 1. Heating into the austenitizing temperature range to permit the carbon to go into solution and to break down carbides if they are present. 2. Cooling at a slow rate through or holding just below the lower critical temperature range to transform the austenite to ferrite and spheroidal graphite.

The critical temperature for ductile iron depends on its chemical composition. Factors influencing annealing are chemical composition, including alloy content, section size and rate of cooling.

Typical mechanical properties obtained by annealing are: Tensile strength, 60,000 to 80,000 psi; yield strength, 45,000 to 60,000 psi; elongation, 10 to 25 per cent in 2 in.; Brinell hardness, 140 to 200; Charpy impact unnotched, 60 to 115 ft-lb.

Chemical Effects — Manganese and phosphorus contents of ductile iron should be as low as possible if annealed properties are desired. Alloying elements, such as chromium, nickel and molybdenum, retard the annealing cycle and should be held to a minimum or the cycle adjusted to compensate for their effects. Higher silicon content promotes ease of annealing at the expense of lowering the elongation and impact resistance.

Annealing Cycle — Ductile iron castings may be annealed in one of the following ways:

1. Heat to 1650°F for 1 hour, plus 1 additional hour for each inch of section thickness. Cool to 1275°F (slightly below the lower critical temperature) and hold 5 hours, plus 1 hour for each inch of section thickness. Cool in any convenient manner to room temperature. This treatment requires close control of the 1275°F hold, so that the pearlite will transform to ferrite and spheroidal graphite.

2. Heat to 1650°F and hold for 1 hour, plus 1 additional hour for each inch of section thickness. Furnace cool to 1200°F controlling the cooling rate between 1450°F and 1200°F to a maximum of 35°F an hour. Cool to room temperature.

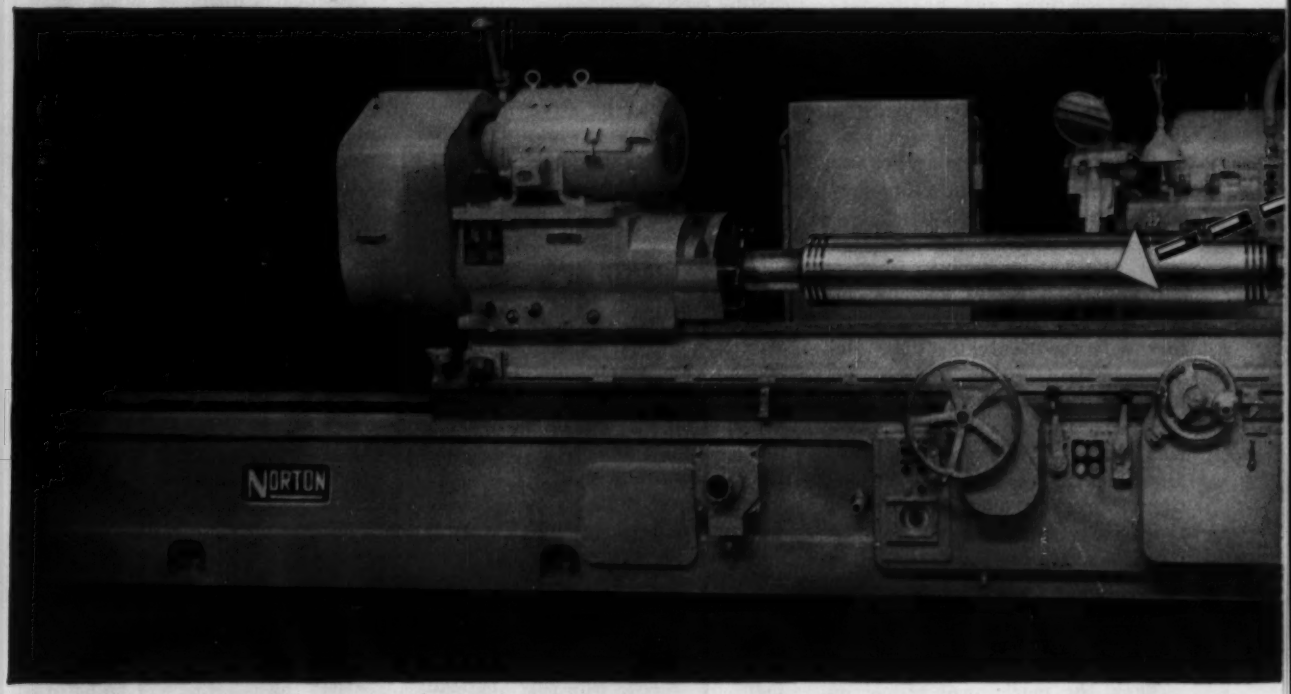
3. Heat to 1300°F for 5 hours, plus 1 additional hour for each inch of section thickness, furnace cool to 1100°F, then cool to room temperature at any convenient rate. This short annealing cycle may be used when the sole objective is to ferritide the matrix. Improved impact resistance is developed with full two-temperature stage annealing.

Stress Relief Temperature (°F)	Time (hours)	Tensile Strength (psi)	Yield Strength (psi)	Elongation (per cent)	Brinell Hardness
As-cast	-	97,500	70,500	8.0	223
1000	8	96,500	66,000	7.0	217
1150	8	88,500	64,000	10.0	197
1200	8	75,500	59,000	11.5	183
1250	8	72,000	56,500	16.0	163

Fig. 2—Effect of stress relief temperature on the mechanical properties of as-cast ductile iron bars of 1-in. section. Chemical composition is 3.42 per cent carbon and 2.52 per cent silicon

* *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Here's a heavy duty grinder



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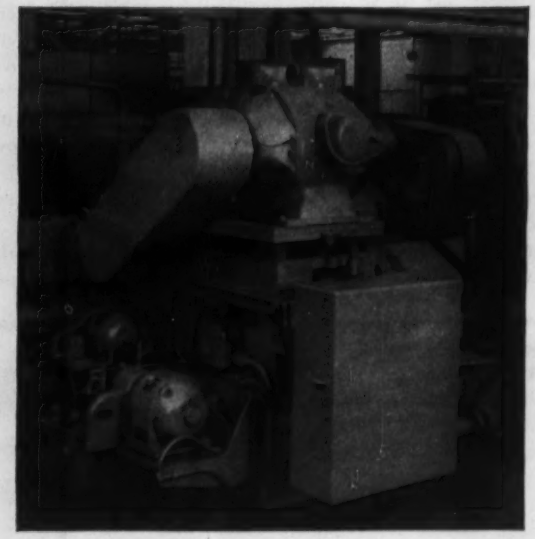

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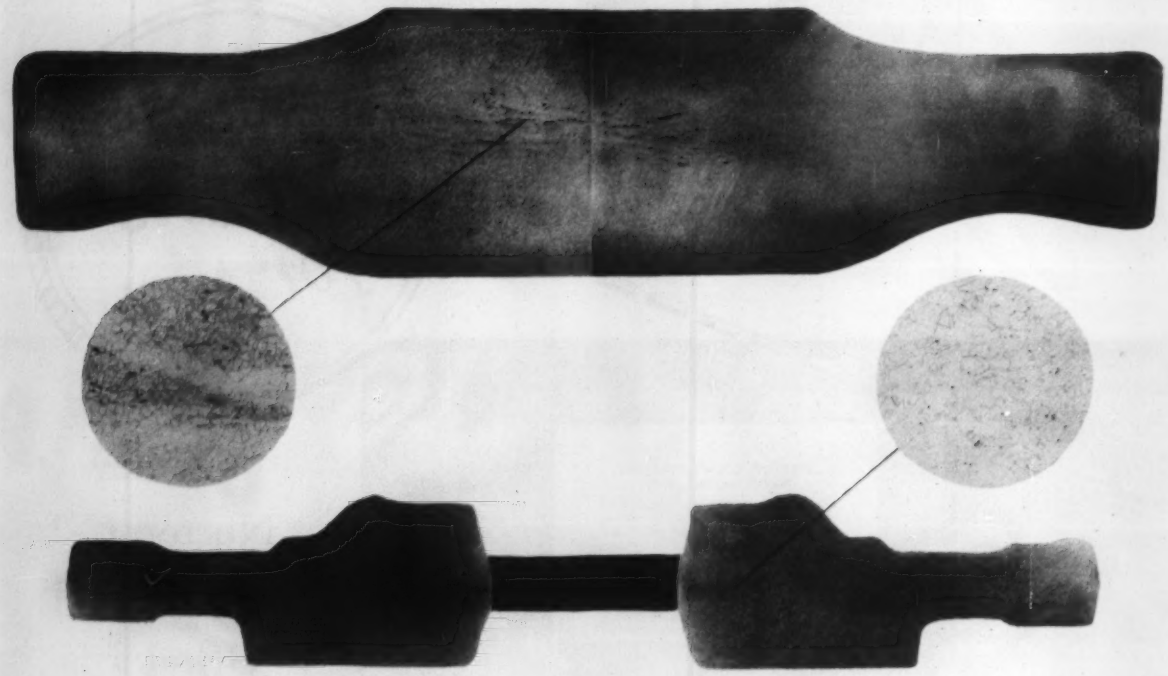


Jet turbine wheel forgings made from 9-in.-square billets of alloy A-286. (Top) Air arc melted material; macroetched section shows center segregation. (Bottom) Vacuum consumable electrode billet; section is segregation free

New Refinement Boosts Vacuum Metals

YOU can get all the vacuum melted metals you need even if there were a spurt in demand.

The last few months have seen several companies announce production facilities for vacuum melting. Just recently Allegheny Ludlum Steel Corp. had its say: "We can make ten times as much high quality superalloys, tool steels or stainless steel in our new vacuum melting department as industry is now using per month. It's designed so it can be rapidly expanded to four times the present size."

Figures—In pounds, Allegheny Ludlum can turn out 250,000 lb of metal per month. This can be increased to 1 million lb per month on short notice.

"One of the main considerations for a customer who needs substantial quantities of high quality superalloys has been availability," says W. B. Pierce, Allegheny's vice president and technical director. "Recognizing this as a basic problem, our company has sufficient capacity to take care of substantial long-term customer commitments."

Different—Most vacuum melting is done by the induction method. Allegheny Ludlum is using a consumable electrode process—probably the first time it has been applied outside the titanium, zirconium and molybdenum fields. Some modifications were necessary.

Here's how it works: Electrodes of the alloy are cast from a production size, electric furnace air melt. They are arc melted under vacuum, using a water-cooled copper crucible.

Vacuum melted ingots up to 12 in. in diameter (weighing 1000 lb) have been made from nickel-base superalloys. Ingots up to 16 in. in diameter (weighing 2000 lb) have been turned out in iron-base superalloys, stainless and other steels. The company says it soon will be melting ingots weighing up to 4000 lb.

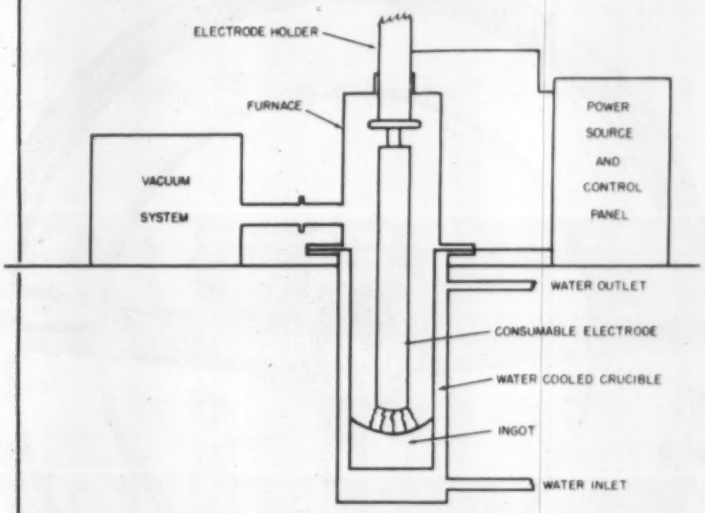
Takes Away Gas—A big reason for vacuum remelting is to give alloys properties that cannot be reached in air melted material. One is lower gas content.

In the consummable electrode process, gas bubbles form in the molten metal around the arc. They eventually burst and the gases are pulled out by the vacuum.

Also, gases are withdrawn from

Consumable electrode vacuum melted metal vs. air melted

1. A higher degree of cleanliness because nonmetallic inclusions and gases are removed
2. Homogeneity is better due to freedom from segregation
3. Improved workability and ingot soundness give user increased yield of product
4. Mechanical properties are better



Consumable electrode vacuum melting furnace used at Allegheny Ludlum Steel Corp. Electrodes of alloy to be processed are cast from air-melt electric furnace, then arc remelted under vacuum

smaller metal droplets on transfer from the electrode to the molten pool without bubble formation. The high ratio of surface area to volume makes removal easy.

Chemical analyses of alloys M-252, Waspaloy and A-286 for hydrogen, oxygen and nitrogen after vacuum remelting show gas content about the same as for induction vacuum melted metal.

Cleanliness Better — Nickel-base and iron-base alloys containing titanium are difficult to melt cleanly in air. The main problem is formation of titanium oxides, nitrides or carbonitrides which show up in finished bars or billets as stringers.

Vacuum processing benefits alloys such as M-252, Waspaloy and the titanium - bearing stainless grade, 321. Improvement also shows up in cleanliness of low-alloy, high-speed and other stainless grades.

Freedom from stringers and other inclusions gives better hot and cold forming properties. Air melted material may crack on drastic upsetting, while vacuum material does not. Such tearing, due to stringers, limits the amount of cold or hot reduction that can be used and may require grinding during intermediate stages of a forging cycle. Sometimes bars or billets must be rough turned before starting forming operations.

Mechanism—How does this vacuum cleaning up process work? Here's the way it is explained by W. W. Dyrkacz, Allegheny Ludlum's associate director of research in charge of high temperature alloys and valve steels:

1. Unstable oxides and compounds are dissociated under the low pressure and high temperature used. Arc temperature is estimated to be over 6000°F—more than twice that reached in induction vacuum melting.

2. More stable compounds, such as titanium nitrides, which have a lower specific gravity than the melt, are removed by levitation or floating out.

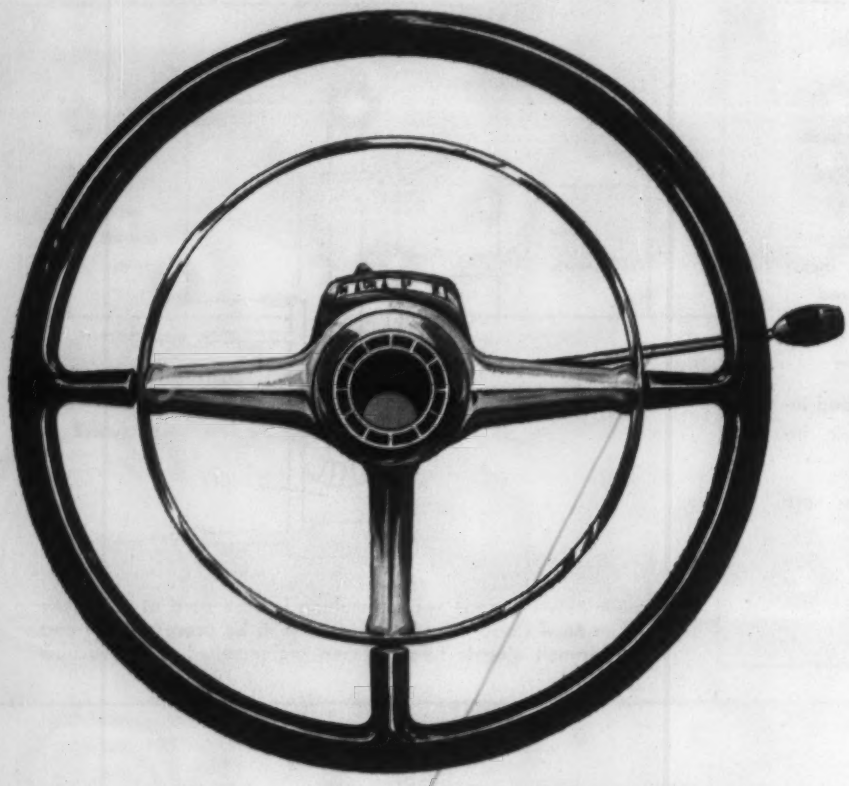
Better Tensile—In a number of uses for high temperature alloys (gas turbine wheels are one), high tensile ductilities are required in the center of the part. This depends on cleanliness and segregation in the center of large billet stock used to make them. In turbine wheel alloys (such as A-286) experience shows that center ductility goes down as the amount of segregation increases — getting worse as ingot size goes up.

This problem is minimized—in fact, virtually eliminated—by consummable electrode vacuum melting. Reason: The fast cooling and close control of solidification rates that cold mold-arc melting makes possible.

Other Properties Better, Too—Hot tensile and stress rupture ductility are improved in alloy M-252 by vacuum remelting. Also, a 15 per cent improvement in the 1500° F fatigue strength has been reported.

The endurance limit at 1200°F of air melted A-286 varies between 37,000 and 47,000 psi. Consummable electrode melted material gives an endurance limit of 47,000 psi.

This can be increased to over 55,000 psi by raising titanium content above the A-286 limit and modifying the heat treatment. The higher titanium A-286 would be hard to make from air melted ingots because of hot workability and other segregation problems.



How a shift in gears saved $256,000

Five million MUELLER BRASS CO. forged ring gears improve automatic transmission operation . . . at lower cost to the manufacturer.

Ever since one of the leading manufacturers of automotive transmissions began using ring gears forged from Mueller Brass Co. bearing bronze, production costs have been cut nearly $256,000. That's because the rough forging weighs less and is closer to finished size than a sand cast ring gear formerly used. This shift in gears resulted in a savings in metal costs, greatly reduced machining time and increased tool life. In addition, the use of forged gears has cut scrap loss and eliminated costly inspection rejects.

The performance of these forged ring gears is also far superior to the sand cast gear, which had a tendency to flake away and crack around the teeth, causing failures. More than five million forged ring gears have now been used in these transmissions without a single failure. Being porous, the sand casting was difficult to balance, but the forging has a dense, homogeneous structure that helps keep it in perfect balance.

Strong, long-wearing non-ferrous metal parts, forged to your specifications by Mueller Brass Co., can help reduce your costs and improve the performance of your products just as they have done in this transmission application. For complete information, write us today.

Write today for your complete set of Mueller Brass Co. engineering manuals.

MUELLER BRASS CO. PORT HURON 19, MICHIGAN

154

Dynamic Braking Increases Brake Lining Life on Overhead Cranes

Dynamic braking controllers at the Aluminum Co. of America plant in Point Comfort, Tex., have practically eliminated lining wear.

Controllers provide electrical braking by separately exciting the series field of the drive motor to positively decelerate the crane.

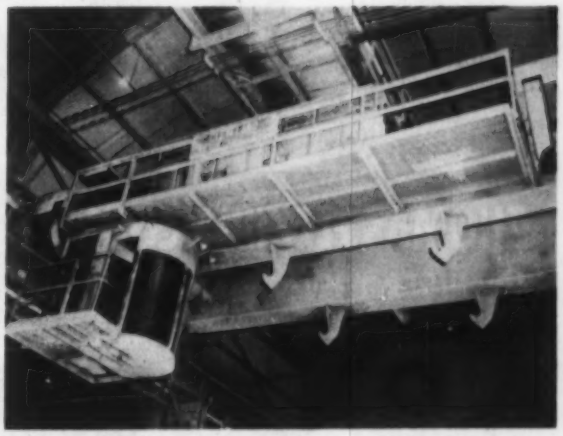
A limit switch under the foot brake pedal applies the braking.

When the operator wishes to stop his crane, a slight depressing of the brake pedal closes the limit switch and applies dynamic braking to absorb initial momentum. Additional pressure on the pedal actuates the standard foot brake.

Overhead traveling cranes equipped with dynamic braking were installed at Alcoa's plant in 1949. None of the brake lining has needed replacement.

The cranes move heavy pots of molten aluminum an average distance of about 500 ft at high speed.

Recent examination of the original linings showed wear averaged 1/16-in. Three times that much is permissible before replacement is necessary. *Write*: Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, O. *Phone*: Utah 1-6100



Automatic Sequence Programming Gives Increased Lathe Versatility

With the numerical sequence programmer, many Monarch lathes can produce precision pieces in volume in fully automatic work cycles.

The key unit is the electronic control panel. It has simple, push-type selectors to preset operations. Once the proper sequence is programmed with the selectors, the start button sets in motion up to five automatic work cycles, using as many as five spindle speeds and five feed rates. Any number of identical workpieces may be turned in succession without further adjustment of the control panel.

Operating with the electronic control panel is an analog-to-digital converter which controls carriage motion of the machine. The converter sends electrical impulses to the control circuits at precise points in the automatic work cycles, actuating the lathe to perform the operations called for by the panel selectors.

Changing the programmer to a completely different sequence of operations is fast and easy: Merely reset the control panel selectors.

Selector setting can be changed manually; a master board, which will simultaneously depress the required selectors when placed in contact with the control panel, can be used; or punched cards computed by the plant methods department can be slipped over the selectors to show, through the punched holes, the exact pattern to be set for an operation.

The air gage tracer used with the programmer has a dual template system. Tracer control is provided for the last rough and final finish cuts. *Write*: Monarch Machine Tool Co., Sidney, O. *Phone*: 2-1381

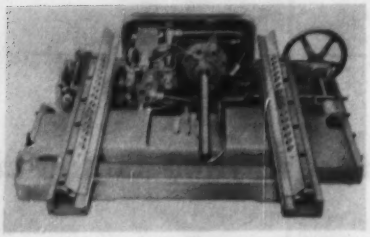
NEW PRODUCTS and equipment

Surface Grinders

A new precision crossfeed screw and ball bearing saddle ways makes for smoother, more precise saddle traverse adjustment.

Ball bearings roll in square channels; table rocking and excessive wear are eliminated. The preloaded bearings are packed in grease for lifetime lubrication.

The saddle feed screw is pre-

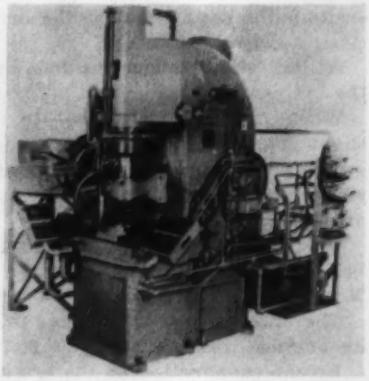


cision ground and has a backlash take-up nut. *Write*: Abrasive Machine Tool Co., East Providence, R. I. *Phone*: East Providence 1-0549

25-Ton Press

This electrically controlled press automatically assembles and stakes the drive flange of an automatic transmission to a pinion gear. It then assembles a bushing into the gear.

The machine has a special work base, a hydraulic assembly cylinder, hydraulic loader and hopper feed. In assembly, a spiral bar and nut guides the flange to the helical spline teeth of the gear.



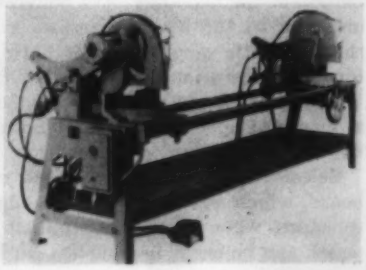
Tooling includes a helical spline locater and hardened and ground staking tools mounted on the ram nose piece. The complete cycle for assembly of a piece is about 17 seconds. *Write*: American Broach & Machine Co., 415 W. Huron St., Ann Arbor, Mich. *Phone*: Normandy 2-5621

Double Cutting Machine

Lengths from 22 to 102 in. are cut. The machine uses saw blades for nonferrous metals, abrasive cutoff wheels for ferrous metals.

Two semi-independent heads cut simultaneously. They can be positioned to make 90 degree cuts, or will cut at any angle up to 45 degrees in either direction.

Oil mist sprays lubricate the blades through each cut. When



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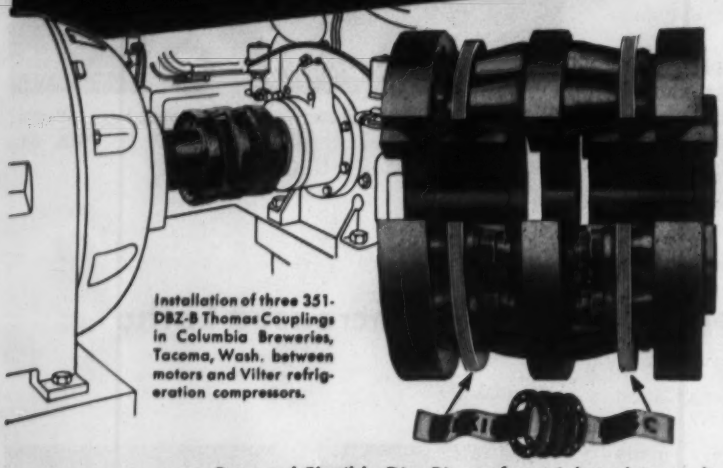
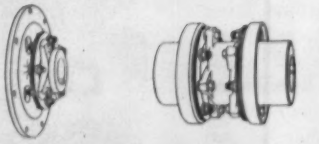
for more years of better service!



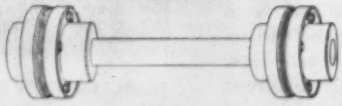
Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



THOMAS

Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

cuts are finished, the saw blades retract automatically into guards, and the operator removes the cut section.

The machine is powered by two 3½-hp induction motors. Spindle speed is 3200 rpm. *Write*: Stone Machinery Co. Inc., Manlius, N. Y. *Phone*: Manlius 62-2411

Transfer Machine

The 45-station machine does 249 drilling, boring, reaming and tapping operations on 52 transmission cases in an hour.

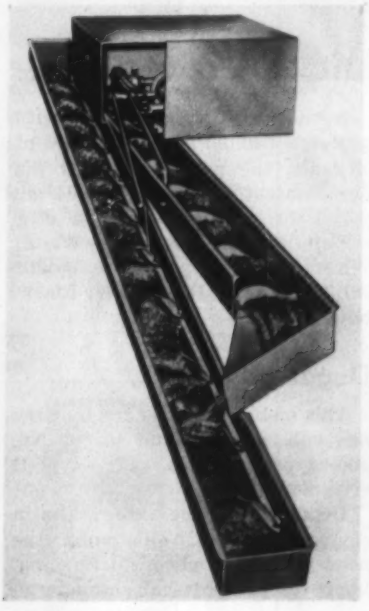
Many electrical components aid operations. One automatically probes each hole before it is tapped.

Every moving component of the transfer machine is automatically lubricated. The ways are made of hardened - and - ground laminated tool steel. *Write*: Buhr Machine Tool Co., Ann Arbor, Mich. *Phone*: Normandy 2-5646

Shuttle Conveyor

The Delpark-Jamesway conveyor operates on a single level. It runs in a trough or trench.

A shuttle drive bar rests on the bottom at either side or in the center. Hinged to it are blades which open to the width of the trough as the drive bar starts its forward movement. Blades move the material to the maximum forward stroke of the drive bar. As movement is reversed, blades fold back against the drive bar and by-pass the material advanced by the blade in back.



Trough and blade widths range from 6 to 30 in. The stroke can be adjusted to advance rapidly and return slowly, or to advance slowly and return rapidly. *Write*: Dept. J-297, Industrial Filtration Co., Lebanon, Ind. *Phone*: 1877

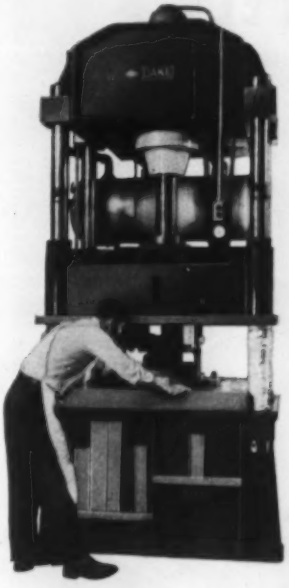
Core Coating

A nondrip, carbon-free refractory foundry core coating called Red-Skin is recommended for steel, gray iron and the nonferrous metals.

The coating works deeply into cores, preventing metal penetration.

A uniform surface coating prevents burn-in and sand sintering. Maximum fill is obtained on porous core areas.

The coating is easy to mix, does



"Now we can handle more and bigger jobs"

The experience of Michigan Machine and Tool Co. duplicates that of many other custom die shops who have installed a Dake Die Try-Out Press

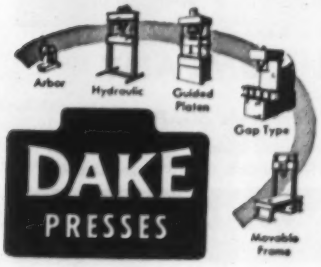
Michigan Machine & Tool Co. of Grand Rapids earned an enviable reputation as diemakers for a number of important manufacturers, but they were limited to building smaller size dies for lack of try-out facilities.

"We found it quite impractical," they said, "to interrupt a customer's production while we tried out a die on his press."

Since installing a Dake Die Try-Out Press, Michigan Machine & Tool Co. is being commissioned to make more dies, and bigger dies . . . bringing a substantial increase in business and correspondingly in profits.

Information on Dake Die Try-Out Presses is contained in Bulletin No. 330 . . . send for a free copy today.

DAKE CORPORATION, 640 Seventh St., Grand Haven, Mich.



Send for Big New Catalog

DAKE CORPORATION
640 Seventh St., Grand Haven, Mich.
Please send me a copy of Dake Bulletin 330
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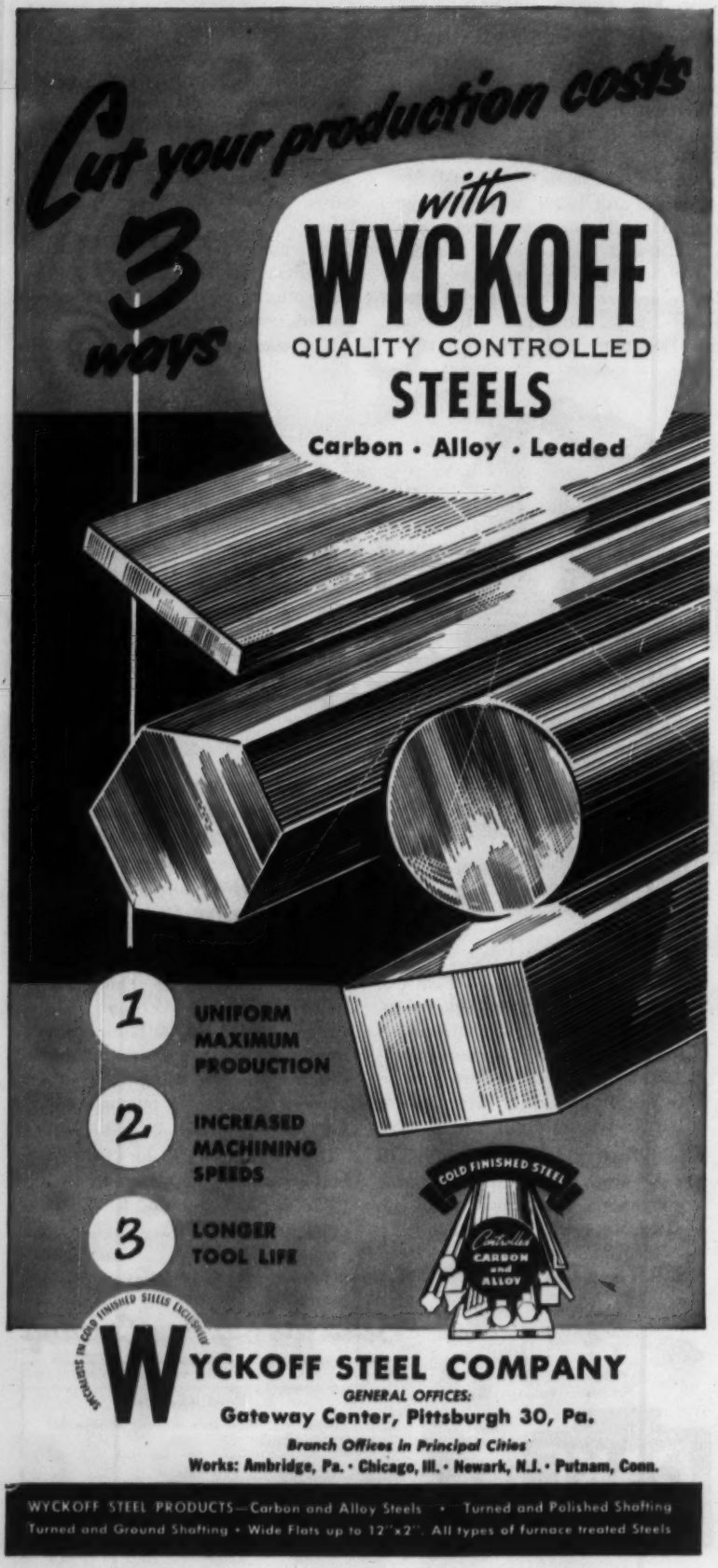
Company_____
Address_____
City_____ Zone____ State_____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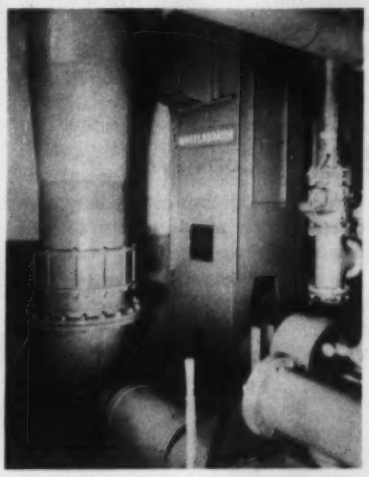
NEW PRODUCTS and equipment

not streak, teardrop, run down or build up in fillets. *Write*: Frederic B. Stevens Inc., 1800 18th St., Detroit 16, Mich. *Phone*: Tashmoo 5-0725

Air Filtration

A new process, Ultrafiltration, offers supercleaning of atmospheric air with industrial air filtration equipment.

The process uses conventional industrial collectors of the tubular cloth type. Filter bags are charged with a filter aid that precoats the filtering surfaces and provides a highly efficient matrix upon which the fine particles of atmospheric dust and tarry matter are collected. One application of filter aid lasts from two to three years.



In one operating installation with a design volume of 720,000 cfm of city air, the process reduces the dust content from 5.21 to 0.04 mg per 1000 cu ft. Collection efficiency is 99.23 per cent. *Write*: Wheelabrator Corp., 1157 S. Byrkit St., Mishawaka, Ind. *Phone*: Blackburn 5-2141

Degasser

This mobile degasser for foundry use will accommodate up to No. 400, type-A or No. 3600, type-B crucibles.

Degassing by the unit results in cleaner castings, eliminates the need for gas or chemical flushing, improves the physical characteris-

Calumet Division, Calumet and Hecla, Inc., Calumet, Michigan

"Cities Service Heat Prover Played A Major Role In Our Expansion Program"

Miners and refiners of copper, the Calumet, Michigan Division of Calumet and Hecla, Inc., relies on two power plants to operate its many mines, reclamation plants, mills, manufacturing facilities and mine rehabilitation projects.

The two plants, located at Lake Linden and Hubbell, were recently brought up to date. The Lake Linden plant now has modern steam generating equipment fired with pulverized coal. The Ahmeek plant was equipped with new coal distributors for its underfeed stokers and new plastic monolithic furnace settings.

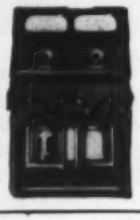
This modernization program, along with a planned preventive maintenance program which is now being put into effect, is expected to raise the KW capacity of these plants from 20 megawatts to 30 within the next few months.

The Cities Service Heat Prover has played a major role in this improvement program. It is used extensively to examine combustion conditions in the furnaces, check station instruments, and guard against air infiltration through boiler settings and duct work, thus enabling plant personnel to operate the equipment constantly at design efficiencies or better.

Says Power Superintendent, Robert Hein: "The portable Cities Service Heat Prover has proved invaluable in our operation. We are now using 150,000 tons of coal per year and operating at boiler efficiencies around 86%. By giving us a quick, accurate check on our firing conditions, the Heat Prover has been directly responsible for much of this record."

The Heat Prover is supplied and maintained free by Cities Service. For further information write Cities Service Oil Co., Sixty Wall Tower, New York 5, N. Y.

Calumet Reclamation Operation reclaims stamp sands processed years ago and dumped into lake. Further processing will extract copper. For power, dredge relies on the Calumet Division's Lake Linden Power Plant.



Taking Readings With Heat Prover has helped Calumet Division achieve 86% boiler efficiency. Will aid further in raising KW capacity from 20 to 30 megawatts. The unique instrument enables maximum heat benefits from coal.

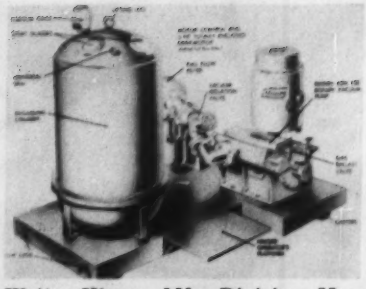
CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

tics of the metal, allows use of lower grade secondary metals and makes impregnation unnecessary.

The unit, mounted on wheels, is 6 ft square and 5 ft high. It has a mechanical vacuum pump and gear motor, a filter and a degassing chamber. Three sight ports 4 in. in diameter permit observation of the melt.

The complete degassing cycle usually takes from 5 to 15 minutes.



Write: Kinney Mfg. Division, New York Air Brake Co., 3640 Washington St., Boston, Mass. *Phone*: Jamaica 4-3220

Live Storage Rack

First-in, first-out live storage is provided for boxed or palletized loads, tote pans and similar containers.

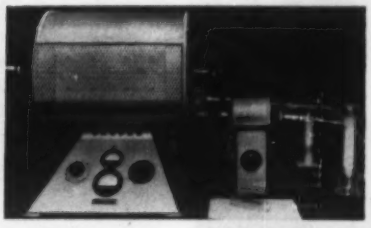
The strong, wide-based design of the live rails makes them ideal for racks. Racks take about half the number of rails generally used because the live rails have two rows of wheels, and each rail serves two lanes.

Guards are built integrally with the rails. Assembly is simple, and the width of lanes can be changed quickly on the job. Length, width and height are adjustable. *Write*: Alvey-Ferguson Co., Cincinnati 9, O. *Phone*: Redwood 1-7000

Hydrogen Determination

This ignition train reduces time for hydrogen determination to 20 minutes.

It determines concentrations as low as 0.003 per cent and as high as those in metal hydrides.



A large sample, up to 10 grams, can be used. A carbon determination can be made at the same time. *Write*: Ledoux & Co., 359 Alfred Ave., Teaneck, N. J. *Phone*: Teaneck 7-7160

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The street scene above is only one of many field housing projects completed by Whitmor Homebuilders. It is good business to protect your investment in the field by having satisfied employees . . . and satisfied employees live in site fabricated, quality field homes as constructed by Whitmor. Over 35 years of home construction throughout the nation. Investigate the Whitmor "Lease-Rental" plan before planning your next housing project.

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NEW literature

Write directly to the company for a copy

Ductile Iron

Typical applications and information on ductile iron are presented—Reader Service Section, International Nickel Co. Inc., New York 5, N. Y.

Submerged Combustion

The use of high velocity burners for heating liquids is described—bulletin 110, 2 pages. Thermal Research & Engineering Corp., Conshohocken, Pa.

Nitrogen Generators

A detailed flow diagram explains the operation of nitrogen generators—bulletin 1-100, 6 pages. C. M. Kemp Mfg. Co., 405 E. Oliver St., Baltimore 2, Md.

Hardness and Strength

This chart shows the approximate relationship between the tensile strength and hardness of carbon and alloy steels—as measured by Brinell, Monotron, Vickers and the B, C and E Rockwell scales. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

Lubricants

The advantages of molybdenum disulphide lubricants where bearing pressure is extreme and at all temperatures are described — bulletin 103A, 4 pages. Alpha Molykote Corp., 65 Harvard Ave., Stamford, Conn.

Nickel Silver

This catalog gives complete information on nickel silver, phosphor bronze and special alloys in strip, sheet and coils—60 pages. Waterbury Rolling Mills Inc., Waterbury, Conn.

Wire Construction

Thirty-six illustrated case histories show how you can reduce costs by including wire in product design—12 pages. E. H. Titchener & Co., 67 Clinton St., Binghamton, N. Y.

Pressure Measurement

A new linear, force-balance instrument pneumatically transmits the measurement of pressure differences up to 300 psi—bulletin MSP-130, 4 pages. Hagan Corp., 323 Fourth Ave., Pittsburgh 30, Pa.

Drilling

Finish machining of deep holes in solid metal or cored holes in castings is illustrated—bulletin 31154, 8 pages. Ex-Cell-O Corp., Detroit 32, Mich.

High Speed Steel

A data sheet gives information on a free machining molybdenum-tungsten steel. Sales Dept., Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa.

Switchboards

The building block concept, as applied to switchboards with basic circuits, and basic circuit specifications in duplex switchboards are discussed—bulletin GEA-4127B. General Electric Co., Schenectady 5, N. Y.

Turbodiesel

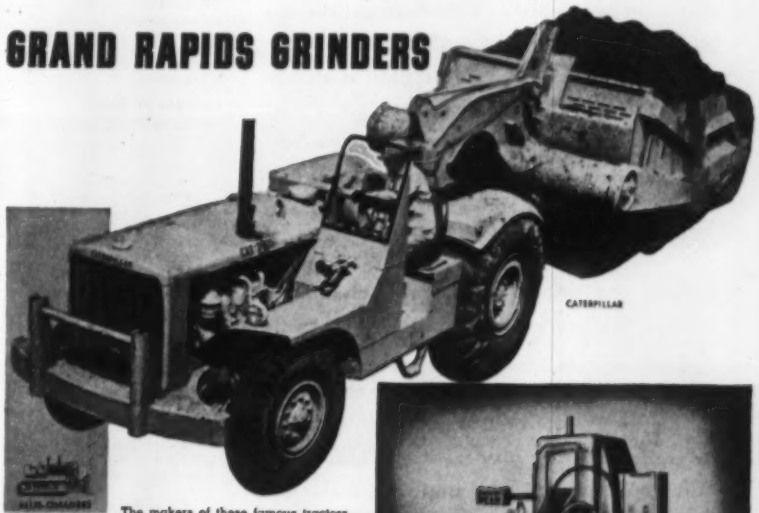
Turbocharging and its advantages when applied to diesels are presented—16 pages. Cummins Engine Co. Inc., Columbus, Ind.

Forgings

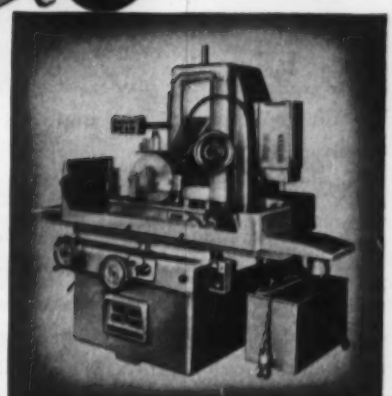
"What Is a Forging?" tells how forgings are made and their uses—8 pages. "Management Guide to the Use of Forgings" states the advan-

FOUND WHERE WORLD FAMOUS TRACTORS ARE "BORN"

GRAND RAPIDS GRINDERS



The makers of these famous tractors and allied heavy-duty equipment use Grand Rapids Grinders in their toolrooms. In fact, you'll find Grand Rapids Grinders wherever manufacturers place a premium on precision . . . because they're designed and built for lifetime precision grinding. Take our Model 560, shown at right. Its column and base are a massive, one-piece casting for permanent, rigid alignment. Wheel head has powered rapid vertical travel; cross feed and longitudinal travel table are hydraulically actuated. Table speed is variable up to 140 fpm, making this the *fastest* grinder of its type and size!
If you're not already enjoying these standout features in your toolroom, a note on your letterhead will bring full details.



Grand Rapids No. 560 Hydraulic Feed Surface Grinder. Table speed up to 140 fpm. Working surface of table is 14" x 36". Vertical movement of wheel head is 18". Preloaded ball bearing spindle greased for life. Spindle speeds 1800 and 2140 rpm.

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NEW LITERATURE

tages forgings give the designer, metallurgist, purchasing agent and management—6 pages. Drop Forging Association, 419 S. Walnut St., Lansing 33, Mich.

Pump Seals

One-piece pump seals for use on rotary shafts of boiler feed pumps and process pumps are described—bulletin AD-151, 12 pages. Garlock Packing Co., Palmyra, N. Y.

Hose Couplings

Described are a quick-connecting coupling with swiveling to prevent hose twisting and a sealing action that makes the coupling tighter as internal pressure rises—20 pages. Industrial Sales, Titeflex Inc., 10 Hendee St., Springfield 4, Mass.

Grease and Oils

A chart shows the life of a grease that can be used at 250° F—bulletin 40. How to use an antirust coating oil to protect sheet and strip steel and ferrous castings is told in bulletin 42, 2 pages. A nonemulsifying, transparent cutting oil for steels is described—bulletin 39, 1 page. Sun Oil Co., 1608 Walnut St., Philadelphia 3, Pa.

NEW BOOKS

Engineering Standards Multiple V-Belt Drives, Multiple V-Belt Drive & Mechanical Power Transmission Association and the Rubber Manufacturers Association, Multiple V-Belt Drive & Mechanical Power Transmission Association, 27 E. Monroe St., Chicago 3, Ill. 24 pages, $1.

Revised manual indicates the proper sheaves and belts to be used for optimum efficiency and economy.

Power Sawing Hand Book, DoAll Co., 254 N. Laurel, Des Plaines, Ill. 108 pages, $1.

Topics covered range from the origin of the saw to cutoff methods, to sawing recommendations and the characteristics of steel.

Steel Designers' Manual, Charles S. Gray, Lewis E. Kent, W. A. Mitchell and G. Bernard Godfrey, Frederick Ungar Publishing Co., 105 E. 24th St., New York 10, N. Y. 909 pages, $12.50.

This manual, prepared for British steelmakers, gives all the information needed for the design of steel framed buildings.

It pays to judge
JESSOP by the
customers it keeps
Jessop Steel Company, in case you didn't know, is an integrated producer of tool, die, high-speed and stainless steels. It isn't the largest company in the business (yet) but it is growing fast and is certainly the most diversified.
Last year, with business slightly depressed within the specialty steel industry, Jessop kept its old customers and gained new ones until it attained the largest customer list it has enjoyed at any time in its long history.
Now, this year, with the customer list still expanding and all the new and old customers buying in greater volume, Jessop is shipping more steel than ever before, and has been forced to greatly enlarge its facilities to take care of the business.
The moral of the story is this: If all these new people are bringing all this new business to Jessop they must have a reason for it. . . and the reason must be good quality and good service, because those are the things that get new customers and keep them when competition is keen. Why not climb on the band wagon and become a Jessop customer yourself? You'll be glad you did.
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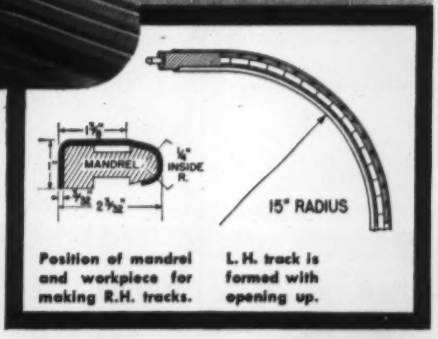
Jessop Steel International Corp., Chrysler Building, New York, New York

OUTLOOK MARK
MARKET OUTLO

Over-all view of Pines Size 2 Automatic Bender in operation at Barber-Colman Company, Door Division, Rockford, Illinois.

Steel Channel Costs Cut 15% AT BARBER-COLMAN CO.



Position of mandrel and workpiece for making R.H. tracks. L.H. track is formed with opening up.

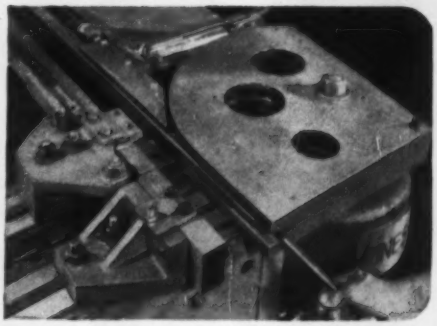
PINES AUTOMATIC BENDER

BOTH L.H. AND R.H. BENDS PRODUCED WITH SAME TOOLING

● Here's another outstanding example of how production bending the "Pines-Way" cuts costs . . . this time for Barber-Colman Company, leading manufacturer of top quality commercial and residential garage doors. By roll shaping door channels from flat stock, then cold bending in a Pines Size 2 Machine, costs have been reduced from 15% to 20%. Formerly, finished channels purchased in lots of 1,000 required extra storage space and a considerable inventory investment to meet the increased demand for "BARCOL" overhead doors. Today, the channels are easily produced as they are needed, which cuts inventory costs, reduces storage and handling problems, and improves delivery.

Smooth, Neat Bends Produced at Production Speeds

As illustrated, 90° bends are formed in HR 13-gauge (.094) steel channels on an inside radius of 15". Of special interest also is that both left and right-hand channels are formed with the same tooling. Smooth, neat bends are produced at production speeds without wrinkling or distorting. As shown in drawing, R.H. tracks are produced with opening down, and L.H. tracks with opening up, which eliminates swing of 8-foot leg. Change in angle specifications are met by the simple angle-of-bend settings on the machine. Setup and operation of machine is handled by semi-skilled machinists.



● Closeup of tooling used for making 90° bend for right-hand track. Flexible mandrel, inserted in channel, insures smooth, wrinkle-free bends. Bending arm speed is 6.0 r.p.m.

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If you would like up-to-date case-study data on production bending applied to steel channels, rods, extrusions, pipe or tubing jobs, write for free copies of "Pines News". Or ask for a Pines engineer to call and assist you with any tooling or production problem.

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STEEL
November 21, 1955

Market Outlook

BUSINESS can't help but be good in 1956. Construction activity and steel demand give that assurance. When they're good, almost everything else is, too.

Construction, the government says, will set a record—$44 billion—in 1956, a 5 per cent rise over the expected $42-billion peak for 1955. Substantial gains in 1956 are anticipated in private nonresidential and public construction—segments that require a considerable amount of steel, particularly structurals.

CHOKE POINT— Deliveries of fabricated structural steel already are extended to the point where they are restricting new orders. Some fabricators are booked ahead eight and nine months, and others almost as far—too far for builders to want to commit themselves on some projects. Result: Some jobs are being dropped quietly before they reach the formal bidding stage.

Lack of structurals is holding some fabricators to a four-day workweek.

PRECAUTIONARY— In estimating an increased volume for second and third-quarter delivery, structural fabricators are taking into consideration the possible higher price of plain material and a rise in other costs. As a result, fabricators' prices for next year are substantially higher than those in the first half of 1955, and escalator terms are more protective.

BUILDUP— The upsurge in demand for fabricated structural steel boosted backlogs 50 per cent between Jan. 1 and Sept. 30. Big chunks are being added to the backlog. In the last week, six awards of orders for fabricated structurals for Connecticut turnpike and highway use totaled 16,430 tons.

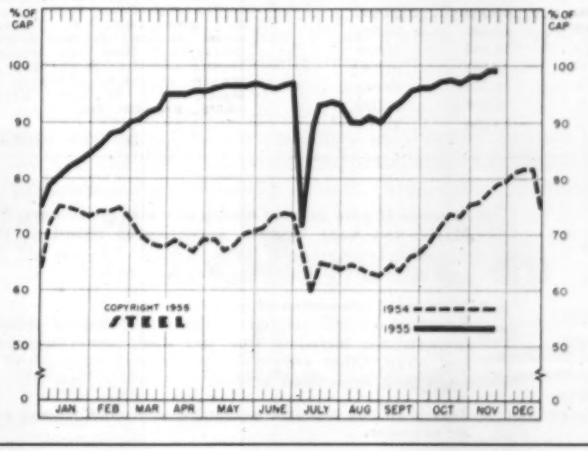
Because a big demand for steel is shaping up for 1956, some producers of sheets are seeking a guide for their second-quarter scheduling: They are encouraging customers to send in inquiries on bare needs for that period. Sheet mills are being offered far more tonnage than they can handle, and they must allot their outturn.

MORE BUSINESS— Railroads — latecomer in the steel marketplace—are adding to the overall demand for steel. They've recently been ordering freight cars by the trainload. They'll need rails, too. Getting on the books for the latter is the Louisville & Nashville Railroad. It ordered 35,000 tons of 132-lb rail.

TOP SPEED— The undiminished call for steel held production of steel for ingots and castings in the week ended Nov. 20 at 99 per cent of capacity for the second consecutive week. That's equivalent to 2.4 million net tons. This continues the recordbreaking pace of October. In that month, more steel—10,502,000 net tons—was made for ingots and castings than in any previous month. This boosted production for the first ten months to a new record—96,286,118 tons.

MORE EXPANSION— Prospects for continued heavy demands for steel are prompting announcements of additional expansions in the steel industry. First blast furnaces in the latest round of expansions will be built by Granite City Steel Co., Granite City, Ill., and U. S. Pipe & Foundry Co., North Birmingham, Ala.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Nov. 20	Change	Same Week 1954	Same Week 1953
Pittsburgh	102.5	+ 0.5*	76	81
Chicago	97.5	— 1.5*	85.5	98
Mid-Atlantic	98	+ 0.5	71	90
Youngstown	100	0	82	96
Wheeling	100	+ 1	92	98
Cleveland	99	— 1.5*	88	99
Buffalo	105	0	97.5	100
Birmingham	94.5	+ 0.5	64	96.5
New England	90	— 1	58	85
Cincinnati	92.5	0	76	59.5
St. Louis	90.5	— 6*	83.5	90
Detroit	98	— 1	80	97.5
Western	99	— 1	86	94
National Rate	99	0	79	90.5

INGOT PRODUCTION‡

	Week Ended Nov. 20	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	148.4†	149.7	148.5	117.8
NET TONS (In thousands)	2,384†	2,404	2,386	1,892

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,254,459 in 1953.

Metalworking Outlook—p. 41 Technical Outlook—p. 91

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Nov. 15 1955	Nov. 8 1955	Month Ago	Oct. Average
(1947-1949=100)	154.5	154.5	154.5	154.5

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 15

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parenthesis. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.206
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	7.993
Tie Plates	5.625	Strip, C.R., Stainless, 430 (lb)	0.444
Axles, Railway	8.000	Strip, H.R., Carbon	5.350
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.366
Plates, Carbon	4.950	Pipe, Galv., Buttweld (100 ft)	19.971
Structural Shapes	4.867	Pipe, Line (100 ft)	158.925
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	244.670
Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185	Tubes, Boiler (100 ft)	39.470
Bars, Tool Steel, H.R. Alloy, High Speed W-18, Cr 4, V 1 (lb)	1.680	Tubing, Mechanical, Carbon	20.980
Bars, H.R., Alloy	9.375	Tubing, Mechanical, Stainless, 304 (100 ft)	178.897
Bars, H.R., Stainless, 303 (lb)	0.450	Tin Plate, Hot-dipped, 1.25 lb	8.933
Bars, H.R., Carbon	5.350	Tin Plate, Electrolytic, 0.25 lb	7.633
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	6.733
Bars, C.F., Carbon	5.660	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.175	Wire, Drawn, Stainless 430 (lb)	0.575
Bars, C.F., Stainless, 302 (lb)	0.468	Bale ties (bundle)	6.473
Sheets, H.R. Carbon	5.145	Nails, Wire, 8d Common	8.618
Sheets, C.R., Carbon	6.239	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.690	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.588		

STEEL's FINISHED STEEL PRICE INDEX*

	Nov. 16 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	208.90	208.90	208.90	194.53	157.76
Index in cents per lb	5.659	5.659	5.659	5.270	4.274

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$128.14	$128.14	$128.14	$117.95	$95.09
No. 2 Fdry, Pig Iron, GT	58.99	58.99	58.99	56.54	49.54
Basic Pig Iron, GT	58.49	58.49	58.49	56.04	49.04
Malleable Pig Iron, GT	59.77	59.77	59.77	57.27	50.27
Steelmaking Scrap, GT	45.67	45.33	45.00	33.67	41.67

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 16 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.45
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.45
Bars, H.R., deld. Philadelphia	4.90	4.90	4.90	4.55	3.93
Bars, C.F., Pittsburgh	5.90	5.90	5.90	5.40	4.15
Shapes Std., Pittsburgh	4.60	4.60	4.60	4.25	3.40
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.40
Shapes, deld., Philadelphia	4.88	4.88	4.88	4.53	3.46
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.50
Plates, Chicago	4.50	4.50	4.50	4.225	3.50
Plates, Coatesville, Pa.	4.80	4.80	4.80	4.225	3.90
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.50
Plates, Claymont, Del.	4.80	4.80	4.50	4.225	3.90
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.35
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.35
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.10
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.10
Sheets, C.R., Detriot	5.325-5.425	5.325-5.425	5.325-5.425	5.10	4.30
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.40
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.50-3.75
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.25
Strip, C.R., Pittsburgh	6.25	6.25	6.25	5.75	4.15-4.85
Strip, C.R., Chicago	6.35	6.35	6.35	5.85	4.30
Strip, C.R., Detroit	6.35	6.35	6.35	5.60-5.90	4.35-5.10
Wire, Basic, Pittsburgh	6.25	6.25	6.25	5.75	4.50-4.75
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.30-5.60
Tin plate (1.50 lb), box, Pitts.	$9.45	$9.45	$9.45	$9.05	$7.50
SEMIFINISHED STEEL					
Billets, Forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00	$63.00
Wire rods, $\frac{7}{32}$-$\frac{1}{2}$" Pitts.	5.025	5.025	5.025	4.675	3.85
PIG IRON, Gross Ton					
Bessemer, Pitts.	$59.50	$59.50	$59.50	$57.00	$50.00
Basic, Valley	58.50	58.50	58.50	56.00	49.00
Basic, deld. Phila.	62.16	62.16	62.16	59.66	53.39
No. 2 Fdry, Pitts.	59.00	59.00	59.00	56.50	49.50
No. 2 Fdry, Chicago	59.00	59.00	59.00	56.50	49.50
No. 2 Fdry, Valley	59.00	59.00	59.00	56.50	49.50
No. 2 Fdry, deld. Phila.	62.66	62.66	62.66	60.16	53.89
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88	45.88
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.58	52.58
Malleable, Valley	59.00	59.00	59.00	56.50	49.50
Malleable, Chicago	59.00	59.00	59.00	56.50	49.50
Ferromanganese, Duquesne.	190.00†	190.00†	190.00†	190.00†	175.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$45.50	$44.50	$44.50	$34.50	$44.00
No. 1 Heavy Melt, E. Pa.	47.00	47.00	46.50	33.50	41.00
No. 1 Heavy Melt, Chicago	44.50	44.50	44.00	33.50	40.00
No. 1 Heavy Melt, Valley	48.00	48.00	48.00	34.50	43.75
No. 1 Heavy Melt, Cleve.	45.50	45.50	45.50	32.50	43.25
No. 1 Heavy Melt, Buffalo	43.50	43.50	38.50	32.50	41.50
Rails, Rerolling, Chicago	66.50	65.50	65.50	54.50	64.50
No. 1 Cast, Chicago	47.50	47.50	48.50	39.50	59.00
COKE, Net Ton					
Beehive, Furn, Connlsvl.	$13.625	$13.625	$13.625	$13.75	$14.25
Beehive, Fdry, Connlsvl.	16.50	16.50	16.50	16.75	16.50
Oven, Fdry, Chicago	25.75	25.75	25.75	24.50	21.00

Daily Nonferrous Price Record

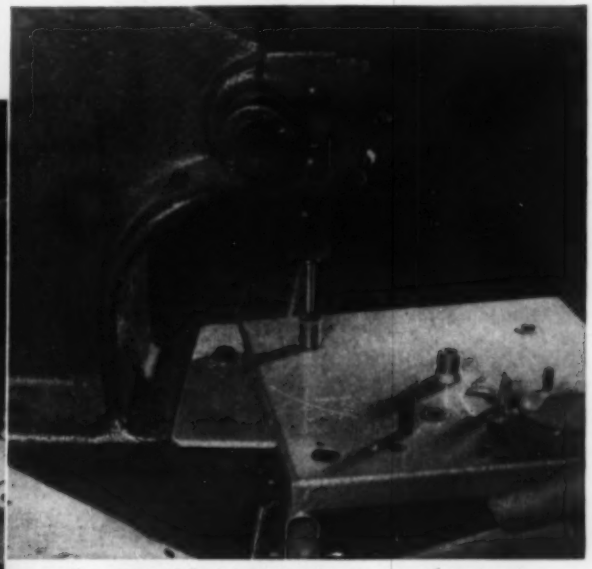
	Price Nov. 16	Last Change	Previous Price	Oct. Avg.	Sept. Avg.	Nov. 1954 Avg.
Copper	43.00-45.00	Oct. 7, 1955	43.00-50.00	44.594	45.380	30.000
Lead	15.30	Sept. 26, 1955	14.80	15.300	14.920	14.800
Zinc	13.00	Oct. 21, 1955	13.00-13.50	13.020	12.940	11.500
Tin	98.50	Nov. 16, 1955	97.50	96.230	96.565	91.196
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	60.000
Aluminum	24.40	Aug. 8, 1955	23.20-24.40	24.400	24.400	22.200
Magnesium	32.50	Aug. 16, 1955	28.50	32.500	32.500	27.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld, New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

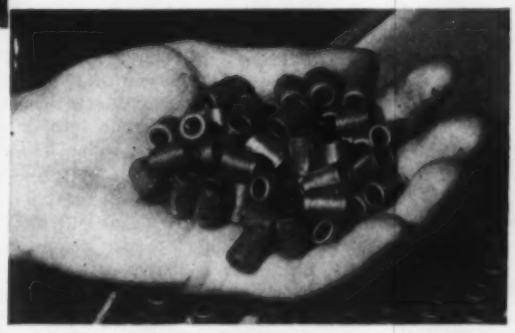
What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

Johnson Ledaloyl self-lubricating bearings hold oil like a sponge—will never need oiling for the life of Telectro tape recorders. Here one is being slipped on to the shaft of component.



Accuracy of Ledaloyl bearings makes for snug press-fit in the base plate of Telectro recorder.



A handful of trouble-free service for Telectro—Johnson Ledaloyl bearings assure durability of recorder, yet are economical and easy to install.

For Accuracy, Durability And Economy, Telectro Industries Uses Johnson Ledaloyl Self-Lubricating Bearings

Telectro Industries Corporation of Long Island City, New York, insists that every component of their wire and tape recorders must have the quality and stamina to give trouble-free service for the life of the machine.

That is why they chose Johnson Ledaloyl bearings according to Mr. Roy Yasen, Purchasing Agent, who says: "Everything considered—accuracy, price and delivery—we find these self-lubricating bearings to be the most durable in this price range." "People who buy these recorders won't be bothered with taking them apart to oil bearings," continues Mr. Yasen, "that's why we use Johnson Ledaloyl bearings, that have the oil right in them. They last as long as the machines, without lubrication."

A Johnson distributor services Telectro, gives them immediate delivery on stock sizes, calls in a Johnson field engineer to help work out any special items.

Your local Johnson distributor has available more than 400 stock sizes in three basic types—he will be glad to work with you in developing new economy and performance in the items you manufacture. Johnson Bronze Company, 550 South Mill Street, New Castle, Pennsylvania.

Johnson Bearings

GRAPHITED
over 175 sizes

GENERAL PURPOSE
over 900 sizes

UNIVERSAL BRONZE BARS
over 400 sizes

LEDALOYL
over 400 sizes

ELECTRIC MOTOR
over 350 sizes

Nonferrous Metals

With the U. S. getting out of the aluminum stockpiling business temporarily, primary producers can get a better view of how much expansion is needed

Nonferrous Metal Prices, Pages 130 & 131

THE GOVERNMENT will not buy any aluminum for stockpile during the first half of 1956. In addition, it is delaying until Apr. 30, 1956, a delivery of 25,000 tons of aluminum due this quarter.

What It Means—"Now," says one industry spokesman, "we can sit down and make some intelligent decisions pertaining to expansion."

For several years government buying for stockpile was the needed stimulus for aluminum expansion, but during 1955, it became a major obstacle. Producers did not know from month to month how much aluminum would be taken for stockpile. Bankers, wanting to know where aluminum production is going, have been somewhat reluctant to talk about lending more money for expansion when the government's policy was vacillating. Armed with this new decision, the aluminum industry can show the "banker" how all its production (and more) can be used—without stockpile help.

Statistics—It takes some serious thought before embarking on an aluminum expansion program. While it takes about $300 a ton for new steelmaking facilities, a ton of aluminum requires an outlay of $1000 or more (new facilities, not expansion of current plants).

Case Study—Aluminium Ltd. estimates that it is spending some $2 million a week on expansion. Last year this Canadian aluminum ingot producer had sales which were about equal to Reynolds Metals Co.'s. Shipping 40 per cent of its metal to the U. S., it expects to increase its shipments to 241,500 tons of ingots (see table) in 1955. This compares with 204,725 tons in 1954 and a scheduled minimum of 290,000 tons next year.

Emphasis is being placed on its Kitimat, B. C., facilities. The installed capacity of 91,500 tons was put into operation in August, 1954. Construction under way will bring in an additional 240,000 tons. By the end of 1956, some 90,000 tons of this will be in operation. The balance will come into operation at various stages, but will be completed in 1959.

In the U. S., the bullish feeling toward aluminum continues. Olin-Mathieson Chemical Corp. is ready to spend an initial $85 million to enter the field. St. Joseph Lead Co. will come in sooner or later. Anaconda Co. is working on its 60,000-ton facilities and should have them operating at full tilt by the first of the year. Harvey Aluminum Co. is bringing in some 54,000 tons of new capacity. And Alcoa, Reynolds and Kaiser will not be caught napping when it comes to spending money for expansion.

Shipments by Aluminium Sales Ltd. to the U.S.

(aluminum, in short tons)

	To Producers	To Independents	Total
1955*	130,000	111,500	241,500
1954	87,900	116,825	204,725
1953	105,300	124,500	229,800
1950	127,356	32,300	159,656
1946	28,059	1,390	29,449

*Aluminium Ltd. estimate
(Totals include aluminum from all sources but exclude shipments to U. S. government)

Copper Outlook

Barring political uprisings, a flare-up in labor or an overnight increase in demand, the copper shortage may be coming to an end.

While copper is being purchased somewhat on a basis of copper today to melt tomorrow, demand through the rest of this year will remain high as companies scramble to build LIFO inventories.

There will be no price reduction during November and December. Steady demand will see large producers continue to quote 43 cents a pound, while custom smelters will continue to receive 45 cents a pound through December. After that: Look for prices to take a nose dive. Reason: Copper is priced too high, demand should slacken and many industries (and the government) are conducting thorough research programs to find substitute materials.

Herbert Barchoff, president, Copper & Brass Warehouse Association, reports: "The copper industry must start re-educating manufacturers to the advantages of copper or suffer a continual decline in sales and profits." Mr. Barchoff explains that if military requirements should drop in the future, private industry might not be interested in filling the vacuum. Another factor: "Many key industries working on defense contracts are setting up specifications which eliminate copper completely from items which have furnished the bulk of our business. This has been particularly true in the electrical and electronics field," says Mr. Barchoff.

Nickel: Problems Multiply

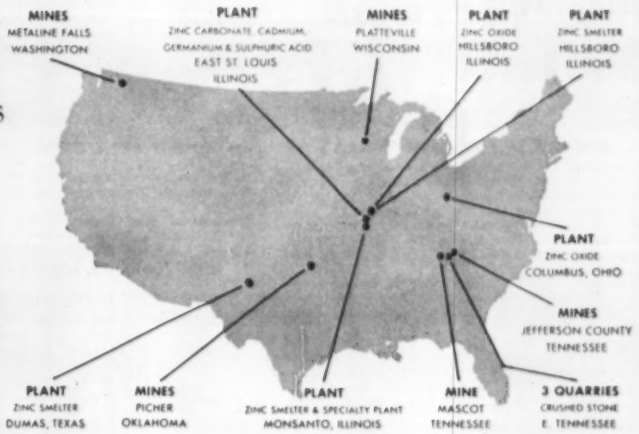
The growing shortage of nickel is bringing increased pressure for some kind of a solution. While most government officials admit that controls could be restored, no one feels that their return will solve the situation.

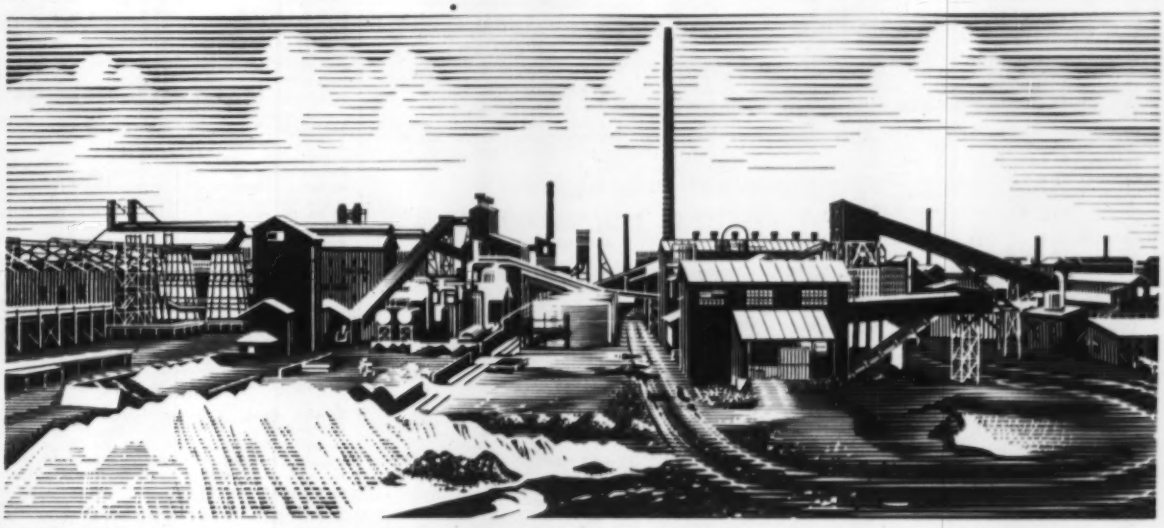
Opinions are circulating in Washington: One group feels that the government should divert all nickel to the civilian market. This is based on thinking that there would be little trouble if the U. S. were out of the market.

Still others are promoting the idea that if war comes it will be of the blitz type—over in six weeks. Stockpiled materials will be of little value.

American Zinc and its products

from A *to* Z





FAIRMONT CITY, ILLINOIS
(East St. Louis)

Operations include: roasting and sintering of zinc concentrates; cadmium plant producing commercial balls, sticks and plates; zinc carbonate plant; germanium plant producing germanium dioxide for the electronics industry. Sulphuric acid is produced by both the Chamber and Contact methods. For complete picture of American Zinc operations, see map above.

PRODUCERS OF

ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
METALLIC CADMIUM
SULPHURIC ACID
LEAD-FREE and LEADED ZINC OXIDES
ZINC CARBONATE
GERMANIUM DIOXIDE
AGRICULTURAL LIMESTONE
CRUSHED STONE

American Zinc sales Company

Distributors for

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, Ohio • Chicago • St. Louis • New York • Detroit • Pittsburgh

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 24.40, pigs 22.50, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 26.20; No. 43, 5% Si, 26.00; 142, 4% Cu, 1.5% Mg, 2% Ni, 28.20; No. 195, 4.5% Cu, 0.8% Si, 27.60; No. 214, 3.8% Mg, 27.80; No. 356, 7% Si, 0.3% Mg, 26.20.

Antimony: R.M.M. brand, 99.5%, 33.00, Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.50, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 43.00 deld. Conn. Valley; 43.00 deld. Midwest; custom smelters, 45.50 deld.; Lake, 43.00 deld.; Fire refined, 42.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$120 nom, per troy oz.

Lead: Common, 15.30, chemical, 15.40, corroding, 15.40, St. Louis, New York basis, add 0.20.

Lithium: 99% +, cups, or ingot, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: 99.8%, self-palletizing pig, 32.50; notched ingot, 33.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingot; for Los Angeles, add 2.00 for both pig and ingot. Sticks 1.3 in. diameter, 53.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, G, H and R, 36.00; alloy M, 38.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50.

Mercury: Open market, spot, New York, $280-$285 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced, $3-$3.25 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "P" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100, nom., per troy oz.

Palladium: $22-$24 per troy oz.

Platinum: $97-$105 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $9-$10 per lb.

Silver: Open market, 91.625 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 98.50; prompt, 98.375.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.75, grade A-2 (0.5% Fe max), $3.25 per pound.

Tungsten: Powder, 98.8%, carbon, reduced, 1000-lb lots, $4.50 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99+% hydrogen reduced, $4.65. Treated ingots, $6.70.

Zinc: Prime Western, 13.00; brass special, 13.25; intermediate, 13.50, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.35; special high grade 14.50-14.75, deld. Diecasting alloy ingot No. 3, 17.50; No. 2, 18.50; No. 5, 18.00, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, $10 per lb. Powder electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 31.50-33.50; No. 12 foundry alloy (No. 2 grade) 30.50-30.75; 5% silicon alloy, 0.60 Cu max, 32.00-32.75; 13 alloy, 0.60 Cu max, 32.00-32.75; 195 alloy, 32.00-32.75; 108 alloy, 30.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 31.25-32.25; grade 2, 30.25-31.25; grade 3, 29.50-30.50; grade 4, 29.00-30.00.

Brass Ingot: Red brass No. 115, 41.00; tin bronze No. 225, 54.00; No. 245, 47.25; high-leaded tin bronze No. 305, 44.75; No. 1 yellow No. 405, 32.75; manganese bronze No. 421, 36.25.

Magnesium Alloy Ingot: AZ63A, 34.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 34.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.84; rod, bar, wire, $1.81.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 48.35; 30,000-lb lots 48.88; l.c.l., 48.98. Weatherproof, 100,000-lb lots, 46.03; 30,000-lb lots, 46.28; l.c.l, 46.75. Magnetic wire deld., 15,000 lb or more, 55.52; l.c.l., 56.27.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21 per cwt; pipe, full coils, $21 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $14.00-$14.50; sheared mill plate, $11.00; strip, $14.00-$14.50; wire, $10.00-$10.50; forging billets, $8.75; hot-rolled and forged bars, $8.75.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 20.50; plates 19.50-22.25.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes H.R.	97	74	93
Seamless Tubes	122	110	153
Shot, Blocks	...	71	...

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	67.9	66.4	...	...
0.156-0.172	57.5	55.9	...	...
0.188	57.5	55.9	...	71.7
0.219-0.234	54.5	52.9	...	...
0.250-0.281	54.5	52.9	...	68.4
0.313	54.5	52.9	...	65.2
Cold-finished				
0.375-0.547	53.4	51.4	63.7	61.3
0.563-0.688	53.4	51.4	60.6	57.5
0.750-1.000	52.1	50.1	55.4	54.2
1.063	52.1	50.1	...	52.3
1.125-1.500	50.1	48.2	53.6	52.3
Rolled				
1.563	48.8	46.9	...	...
1.625-2.000	48.2	46.2	...	50.5
2.125-2.500	47.0	45.0	...	...
2.563-3.375	45.6	43.6	...	...

ALUMINUM

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	37.5	42.3	...	...
0.135-0.096	38.0	43.2	...	...
0.095-0.077	38.7	44.2	36.1	41.3
0.076-0.061	39.3	45.1	36.3	41.5
0.060-0.048	39.9	45.6	36.7	42.0
0.047-0.038	40.4	46.5	37.2	42.4
0.037-0.030	40.8	47.0	37.6	43.1
0.029-0.024	41.4	47.5	37.9	43.6
0.023-0.019	42.2	49.0	38.8	44.5
0.018-0.017	43.0	...	39.4	45.4
0.016-0.015	43.9	...	40.2	46.6
0.014	44.9	...	41.2	47.9
0.013-0.012	46.1	...	41.9	48.9
0.011	47.1	...	43.1	50.5
0.010-0.0095	48.4	...	44.3	52.2
0.009-0.0085	49.7	...	45.8	54.3
0.008-0.0075	51.3	...	47.0	56.1
0.007	52.8	...	48.5	58.4
0.006	54.4	...	49.9	63.4

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam. 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	36.5	40.8
5050-F	37.6	41.9
3004-F	38.6	43.8
5052-F	39.9	45.2
6061-T6	41.1	46.0
2024-T4*	43.6	49.9
7075-T6*	51.4	58.5

*24-48 in. widths or diam, 72-180 in. lengths

ALUMINUM

Forging Stock: Round, Class 1, 39.10-50.10 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 43.00-56.20 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: ASA, Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$16.85	2	$ 51.95
1	26.50	4	143.00
1¼	35.85	6	256.70
1½	42.90	8	386.30

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032 in., 99c; 0.064 in., 78.00c; 0.125 in., 63.50c, 30,000 lb and over, f.o.b. mill.

Plate: AZ31, 61.00c, 30,000 lb or more, 0.250 in. and over, widths 24-60 in., lengths 72-180 in.; tread plate, 64.00c, 30,000 lb or more, ¼-in. thick, widths 24-60 in., lengths 60-192 in.; tooling plate 66.00c, 30,000 lbs or more, .250-3.000 in., widths 60-72 in., lengths 72-180 in.

Extrusions: AZ31 commercial grade, rectangles, ¼ x 2 in., 64.70c; 1 x 4 in., 69.50c. Rod, 1 in., 61.50c; 2 in., 59.00c. Tubing, 1 in. OD x 0.065 in., 82.50c; Angles, 1 x 1 x ⅛ in., 68.40c; 2 x 2 x ¼-in., 62.50c. Channels, 5 in., 63.40c. I-beams, 5 in., 62.70c.

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 19.50; old sheets 16.50-17.25; borings and turnings, 11.00-11.50; crankcases, 16.50-17.25. Industrial castings 16.50-17.25.

Copper and Brass: No. 1 heavy copper and wire, 36.50-37.50; No. 2 heavy copper and wire, 35.00-36.00; light copper, 32.50-33.50; No. 1 composition red brass, 29.00-29.50; No. 1 composition turnings, 27.00-27.50; yellow

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	62.76-63.13b	60.36c	....	62.82-63.32	39.000	39.000	38.250
Yellow Brass	52.27	42.41d	52.81	55.18	28.875	28.625	26.750
Red Brass, 85%	58.09	58.03	58.63	60.90	34.250	34.000	33.500
Low Brass, 80%	56.55	56.49	57.09	59.36	32.750	32.250	31.750
Naval Brass	55.63	49.94	62.69	58.79	26.750	26.500	26.000
Com. Bronze, 90%	60.18	60.12	60.72	62.74	35.750	35.500	35.000
Nickel Silver, 10%	66.00	68.33g	68.33	....	32.500	32.250	16.250
Phos. Bronze, A, 5%	80.99	81.49	81.49	82.67	39.250	39.000	38.000
Silicon Bronze	66.54	65.73	66.58	68.68e	37.625	37.375	36.875
Manganese Bronze	59.37-59.45	53.38-53.47	63.82	....	27.000	26.750	26.000
Muntz Metal	53.74	49.55	....	....	27.000	26.750	26.250

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

brass turnings, 15.50-16.00; new brass clippings, 24.00-24.50; light brass, 16.00-16.50; heavy yellow brass, 18.50-19.00; new brass rod ends, 23.00-23.50; auto radiators, unsweated, 22.00-22.50; cocks and faucets, 23.50-24.00; brass pipe, 24.50-25.00.

Lead: Heavy, 12.00-12.50; battery plates, 6.50-6.75; linotype and stereotype, 13.25-14.25; electrotype, 12.00-12.75; mixed babbitt, 14.50.

Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

Monel: Clippings, 54.50-60.00; old sheets, 45.00-50.00; turnings, 44.00; rods, 54.50-60.00.

Nickel: Sheets and clips, 90.00-125.00; rolled anodes, 90.00-125.00; turnings, 75.00-100.00; rod ends, 90.00-125.00.

Zinc: Old zinc, 5.00-6.00; new die-cast scrap, 5.00-5.75; old die-cast scrap, 3.25-3.50.

REFINER'S BUYING PRICES
(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 22.50-23.00; 3003 clippings, 22.50-22.75; 6151 clippings, 22.50; 5052 clippings, 22.50; 2014 clippings, 21.50-22.00; 2017 clippings, 21.50-22.00; 2024 clippings, 21.50-22.00; mixed clippings, 21.50-22.50; old sheet, 19.00-19.50; old cast, 19.50-20.00; clean old cable (free of steel), 22.50; borings and turnings, 19.50-20.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 65.00; light scrap, 60.00; turnings and borings, 43.00-55.00.

Copper and Brass: No. 1 heavy copper and wire, 39.00-40.00; No. 2 heavy copper and wire, 37.50-38.50; light copper, 35.00-36.25; refinery brass (60% copper) per dry copper content, 36.00.

INGOTMAKERS' BUYING PRICES
(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 39.00-40.00; No. 2 heavy copper and wire, 37.50-38.50; light copper, 35.00-36.25; No. 1 composition borings, 32.00-32.50; No. 1 composition solids, 33.00; heavy yellow brass solids, 22.00-23.00; yellow brass turnings, 21.00; radiators, 25.50.

PLATING MATERIAL
(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 59.42-59.79, oval, 58.92, 5000-10,000 lb; electrodeposited, 56.78, 2000-5000 lb lots; cast 62.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, $1.165; 200-499 lb, $1.15; 500-999 lb, $1.145; 1000 lb or more, $1.14.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 85.50; 1000 lb, 81.50.

Copper Sulphate: 500-1900 lb, 17.90; 2000-5900 lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 3300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 86.875; 16-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 73.50; 100-600 lb, 59.10; 700-1900 lb, 56.60; 2000-9900 lb, 54.80; 10,000 lb or more, 53.70.

Stannous Chloride (Anhydrous): Less than 50 lb, $1.600; 50 lb, $1.260; 100-300 lb, $1.110; 400-900 lb, $1.086; 1000-1900 lb, $1.061; 2000-4900 lb, $1.025; 5000-19,900 lb, 96.40; 20,000 lb or more, 90.30.

Stannous Sulphate: Less than 50 lb, $1.31; 50 lb, $1.01; 100-1900 lb, 99.00; 2000 lb or more, 97.00.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

Norgren

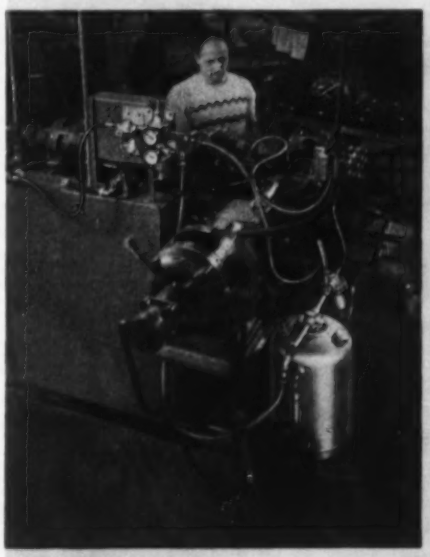
Spray-Lube System

ON TAPPING MACHINE

PRODUCED 4 COST-SAVING RESULTS for A-P CONTROLS CORP.

- increased tap life
- increased tapping speed
- eliminated problems of chips plugging coolant lines
- eliminated messy condition of splashing coolant

Machine taps 12 holes of various sizes simultaneously. Norgren Spray-Lube System includes 5 gal. tank, 12 mixing valves and spray nozzles. Air and fluid line pressures are 42 psi and 44 psi, respectively.



A-P adds 3 more
Since this installation A-P Controls has added Spray-Lube to three other machines.

Write for Norgren Blueprint No. SL-4 and let your Norgren Sales Representative show you what Spray-Lube can do for you.

OIL FOG LUBRICATORS
PRESSURE REGULATORS
AIR FILTERS, VALVES
HOSE ASSEMBLIES

C. A. Norgren CO.
3412 So. Elati, Englewood, Colo

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key on page 133. Key to footnotes, Page 135.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ..... $65.50

INGOTS, Alloy (NT)

Detroit R7 ..... $69.00
Houston 85 ..... 74.00
Midland,Pa. C18 ..... 69.00
Munhall,Pa. U5 ..... 69.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ..... $68.50
Bessemer,Pa. U5 ..... 68.50
Bridgeport,Conn. N19 .. 73.50
Buffalo R2 ..... 68.50
Clairton,Pa. U5 ..... 68.50
Ensley,Ala. T2 ..... 68.50
Fairfield,Ala. T2 ..... 68.50
Fontana,Calif. K1 ..... 76.00
Gary, Ind. U5 ..... 68.50
Johnstown,Pa. B2 ..... 68.50
Lackawanna,N.Y. B2 .. 68.50
LoneStar,Tex. L6 ..... 74.50
Munhall, Pa. U5 ..... 68.50
Pittburgh J5 ..... 68.50
S.Chicago,Ill. R2, U5 .. 68.50
S.Duquesne,Pa. U5 ..... 68.50
Youngstown R2 ..... 68.50

Carbon, Forging (NT)

Aliquippa,Pa. J5 ..... $84.50
Bessemer,Pa. U5 ..... 84.50
Bridgeport,Conn. N19 .. 89.50
Buffalo R2 ..... 84.50
Canton,O. R2 ..... 86.50
Clairton,Pa. U5 ..... 84.50
Conshohocken,Pa. A3 .. 89.50
Ensley,Ala. T2 ..... 84.50
Fairfield,Ala. T2 ..... 84.50
Fontana,Calif. K1 ..... 92.00
Gary,Ind. U5 ..... 84.50
Geneva,Utah C11 ..... 84.50
Houston 85 ..... 89.50
Johnstown,Pa. B2 ..... 84.50
Lackawanna,N.Y. B2 .. 84.50
Los Angeles B3 ..... 94.00
Midland,Pa. C18 ..... 84.50
Munhall,Pa. U5 ..... 84.50
Pittsburgh J5 ..... 84.50
Seattle B3 ..... 98.00
S.Chicago R2,U5,W14 .. 84.50
S.Duquesne,Pa. U5 ..... 84.50
S.SanFrancisco B3 ..... 94.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..... $96.00
Buffalo R2 ..... 96.00
Canton,O. R2, T7 ..... 96.00
Conshohocken,Pa. A3 .. 103.00
Detroit R7 ..... 96.00
Fontana,Calif. K1 ..... 115.00
Gary,Ind. U5 ..... 96.00
Houston 85 ..... 101.00
Ind.Harbor,Ind. Y1 ..... 96.00
Johnstown,Pa. B2 ..... 96.00
Lackawanna,N.Y. B2 .. 96.00
LosAngeles B3 ..... 116.00
Massillon,O. R2 ..... 96.00
Midland,Pa. C18 ..... 96.00
Munhall,Pa. U5 ..... 96.00
S.Chicago R2,U5,W14 .. 96.00
S.Duquesne,Pa. U5 ..... 96.00
Struthers,O. Y1 ..... 96.00
Warren,O. C17 ..... 96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ..... $103.50
Canton,O. R2 ..... 103.50
Cleveland R2 ..... 103.50
Gary,Ind. U5 ..... 103.50
S.Chicago R2, W14 ..... 103.50
S.Duquesne,Pa. U5 ..... 103.50

SKELP

Aliquippa,Pa. J5 ..... 4.325
LoneStar,Tex. L6 ..... 4.625
Munhall,Pa. U5 ..... 4.225
SparrowsPoint,Md. B2 .. 4.225
Warren,O. R2 ..... 4.225
Youngstown R2, U5 ..... 4.225

WIRE RODS

AlabamaCity,Ala. R2 .. 5.025
Aliquippa,Pa. J5 ..... 5.025
Alton,Ill. L1 ..... 5.20
Buffalo B11, W12 ..... 5.025
Cleveland A7 ..... 5.025
Donora,Pa. A7 ..... 5.025
Fairfield,Ala. T2 ..... 5.025
Houston 85 ..... 5.275
IndianaHarbor,Ind. Y1 .. 5.025
Johnstown,Pa. B2 ..... 5.025
Joliet,Ill. A7 ..... 5.025
KansasCity,Mo. 85 ..... 5.275
Kokomo,Ind. C16 ..... 5.125
LosAngeles B3 ..... 5.825
Minnequa,Colo. C10 ..... 5.275
Monessen,Pa. P7 ..... 5.025
N.Tonawanda,N.Y. B11 .. 5.025
Pittsburg,Calif. C11 ..... 5.675
Portsmouth P12 ..... 5.025
Roebling,N.J. R5 ..... 5.125
S.Chicago,Ill. R2 ..... 5.025
SparrowsPoint,Md. B2 .. 5.125
Sterling,Ill.(1) N15 ..... 5.025
Sterling,Ill. N15 ..... 5.125
Struthers,O. Y1 ..... 5.025
Worcester,Mass. A7 ..... 5.325

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 ..... 4.60
Aliquippa,Pa. J5 ..... 4.60
Bessemer,Ala. T2 ..... 4.60
Bethlehem,Pa. B2 ..... 4.65
Birmingham C15 ..... 4.60
Clairton,Pa. U5 ..... 4.60
Fairfield,Ala. T2 ..... 4.60
Fontana,Calif. K1 ..... 5.25
Gary,Ind. U5 ..... 4.60
Geneva,Utah C11 ..... 4.60
Houston 85 ..... 4.70
Ind.Harbor,Ind. I-2 ..... 4.60
Johnstown,Pa. B2 ..... 4.65
KansasCity,Mo. 85 ..... 4.70
Lackawanna,N.Y. B2 ..... 4.65
LosAngeles B3 ..... 5.30
Minnequa,Colo. C10 ..... 4.90
Munhall,Pa. U5 ..... 4.60
Niles,Calif. P1 ..... 4.90
Portland,Oreg. O4 ..... 5.35
Phoenixville,Pa. P4 ..... 5.15
Seattle B3 ..... 5.35
S.Chicago U5, W14 ..... 4.60
S.SanFrancisco B3 ..... 5.25
Torrance,Calif. C11 ..... 5.30
Weirton,W.Va. W6 ..... 4.60

Wide Flange

Bethlehem,Pa. B2 ..... 4.65
Clairton,Pa. U5 ..... 4.60
Fontana,Calif. K1 ..... 5.40
Lackawanna,N.Y. B2 ..... 4.65
Munhall,Pa. U5 ..... 4.60
Phoenixville,Pa. P4 ..... 5.15
S.Chicago,Ill. U5 ..... 4.60

Alloy Std. Shapes

Clairton,Pa. U5 ..... 5.65
Fontana,Calif. K1 ..... 7.30
Gary,Ind. U5 ..... 5.65
Houston 85 ..... 5.75
Munhall,Pa. U5 ..... 5.65
S.Chicago,Ill. U5 ..... 5.65

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ..... 6.75
Bessemer,Ala. T2 ..... 6.75
Bethlehem,Pa. B2 ..... 6.80
Clairton,Pa. U5 ..... 6.75
Fairfield,Ala. T2 ..... 6.75
Fontana,Calif. K1 ..... 7.40
Gary,Ind. U5 ..... 6.75
Geneva,Utah C11 ..... 6.75
Houston 85 ..... 6.85
Ind.Harbor,Ind. I-2, Y1 .. 6.75
Johnstown,Pa. B2 ..... 6.80
KansasCity,Mo. 85 ..... 6.85
Lackawanna,N.Y. B2 .. 6.80
LosAngeles B3 ..... 7.45
Munhall,Pa. U5 ..... 6.75
Seattle B3 ..... 7.50
S.Chicago,Ill. U5, W14 .. 6.75
S.SanFrancisco B3 ..... 7.40
Struthers,O. Y1 ..... 6.75

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ..... 6.80
Lackawanna,N.Y. B2 .. 6.80
Munhall,Pa. U5 ..... 6.75
S.Chicago,Ill. U5 ..... 6.75

PILING

BEARING PILES

Bethlehem,Pa. B2 ..... 4.65
Lackawanna,N.Y. B2 .. 4.65
Munhall,Pa. U5 ..... 4.60
S.Chicago,Ill. U5 ..... 4.60

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ..... 5.45
Lackawanna,N.Y. B2 ..... 5.45
Munhall,Pa. U5 ..... 5.45
S.Chicago,Ill. U5 ..... 5.45

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 ..... 4.50
Aliquippa,Pa. J5 ..... 4.50
Ashland,Ky.(15) A10 .. 4.50
Bessemer,Ala. T2 ..... 4.50
Bridgeport,Conn. N19 .. 4.75
Buffalo R2 ..... 4.50
Clairton,Pa. U5 ..... 4.50
Claymont,Del. C22 ..... 4.80
Cleveland J5, R2 ..... 4.60
Coatesville,Pa. L7 ..... 4.80
Conshohocken,Pa. A3 .. 4.50
Detroit M1 ..... 4.60
Ecorse,Mich. G5 ..... 4.60
Fairfield,Ala. T2 ..... 4.50
Fontana,Calif.(30) K1 .. 5.15
Gary,Ind. U5 ..... 4.50
Geneva,Utah C11 ..... 4.50
GaniteCity,Ill. G4 ..... 4.70
Harrisburg,Pa. P4 ..... 5.10
Houston 85 ..... 4.60
Ind.Harbor,Ind. I-2, Y1 .. 4.50
Johnstown,Pa. B2 ..... 4.50
Lackawanna,N.Y. B2 ..... 4.50
LoneStar,Tex. L6 ..... 4.85
Mansfield,O. E6 ..... 4.50
Minnequa,Colo. C10 ..... 5.35
Munhall,Pa. U5 ..... 4.50
Newport,Ky. N9 ..... 4.50
Pittsburgh J5 ..... 4.50
Riverdale,Ill. A1 ..... 4.50
Seattle B3 ..... 5.40
Sharon,Pa. S3 ..... 4.50
S.Chicago R2, U5, W14 .. 4.50
SparrowsPoint,Md. B2 .. 4.50
Steubenville,O. W10 ..... 4.50
Warren,O. R2 ..... 4.50
Weirton,W.Va. W6 ..... 4.50
Youngstown R2, U5, Y1 .. 4.50

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 ..... 5.65
Fontana,Calif. K1 ..... 6.30
Geneva,Utah C11 ..... 5.65
Johnstown,Pa. B2 ..... 5.65
SparrowsPoint,Md. B2 .. 5.65

PLATES, Wrought Iron

Economy,Pa. B14 ..... 10.40

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 6.725
Bessemer,Ala. T2 ..... 6.725
Clairton,Pa. U5 ..... 6.725
Cleveland J5, R2 ..... 6.725
Claymont,Del. C22 ..... 6.725
Coatesville,Pa. L7 ..... 6.725
Conshohocken,Pa. A3 .. 6.725
Ecorse,Mich. G5 ..... 6.825
Fairfield,Ala. T2 ..... 6.725
Fontana,Calif.(30) K1 .. 7.375
Gary,Ind. U5 ..... 6.725
Geneva,Utah C11 ..... 6.725
Houston 85 ..... 6.825
Ind.Harbor,Ind. I-2, Y1 .. 6.725
Johnstown,Pa. B2 ..... 6.725
LosAngeles B3 ..... 7.625
Munhall,Pa. U5 ..... 6.725
Pittsburgh J5 ..... 6.725
Seattle B3 ..... 7.625
Sharon,Pa. S3 ..... 6.725
S.Chicago,Ill. U5, W14 .. 6.725
SparrowsPoint,Md. B2 .. 6.725
Youngstown U5, Y1 ..... 6.725

PLATES, Alloy

Bridgeport,Conn. N19 ..... 6.55
Claymont,Del. C22 ..... 6.30
Coatesville,Pa. L7 ..... 6.30
Fontana,Calif. K1 ..... 6.95
Gary,Ind. U5 ..... 6.30
Houston 85 ..... 6.40
Ind.Harbor,Ind. Y1 ..... 6.30
Johnstown,Pa. B2 ..... 6.30
Munhall,Pa. U5 ..... 6.30
Newport,Ky. N9 ..... 6.30
Seattle B3 ..... 7.20
Sharon,Pa. S3 ..... 6.30
S.Chicago,Ill. U5, W14 .. 6.30
SparrowsPoint,Md. B2 .. 6.30
Youngstown Y1 ..... 6.30

FLOOR PLATES

Cleveland J5 ..... 5.575
Conshohocken,Pa. A3 .. 5.575
Harrisburg,Pa. P4 ..... 5.575
Ind.Harbor,Ind. I-2 ..... 5.575
Munhall,Pa. U5 ..... 5.575
S.Chicago,Ill. U5 ..... 5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10 .. 4.75
Ashland l.c.l. (15) A10 .. 5.25
Cleveland c.l. R2 ..... 5.10
Warren,O. c.l. R2 ..... 5.10

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala. R2 ..... 4.65
Aliquippa,Pa. J5 ..... 4.65
Alton,Ill. L1 ..... 4.85
Atlanta A11 ..... 4.85
Bessemer,Ala. T2 ..... 4.65
Birmingham C15 ..... 4.65
Bridgeport,Conn. N19 .. 4.80
Buffalo R2 ..... 4.65
Canton,O. R2 ..... 4.75
Clairton,Pa. U5 ..... 4.65
Cleveland R2 ..... 4.65
Ecorse,Mich. G5 ..... 4.75
Emeryville,Calif. J7 ..... 5.40
Fairfield,Ala. T2 ..... 4.65
FairlessHills,Pa. U5 ..... 4.80
Fontana,Calif. K1 ..... 5.35
Gary,Ind. U5 ..... 4.65
Houston 85 ..... 4.90
Ind.Harbor,Ind. I-2, Y1 .. 4.65
Johnstown,Pa. B2 ..... 4.65
Joliet,Ill. P22 ..... 4.65
KansasCity,Mo. 85 ..... 4.90
Lackawanna,N.Y. B2 .. 4.65
LosAngeles B3 ..... 5.35
Massillon,O. R2 ..... 4.75
Midland,Pa. C18 ..... 4.65
Milton,Pa. M18 ..... 4.65
Minnequa,Colo. C10 ..... 5.10
Niles,Calif. P1 ..... 5.00
N.Tonawanda,N.Y. B11 .. 4.65
Pittsburg,Calif. C11 ..... 5.35
Pittsburgh J5 ..... 4.65
Portland,Oreg. O4 ..... 5.40
Seattle B3, N14 ..... 5.40
S.Chicago R2, U5, W14 .. 4.65
S.Duquesne,Pa. U5 ..... 4.65
S.SanFran.,Calif. B3 ..... 5.40
Sterling,Ill.(1) N15 ..... 4.65
Sterling,Ill. N15 ..... 4.75
Struthers,O. Y1 ..... 4.65
Torrance,Calif. C11 ..... 5.35
Warren,O. R2 ..... 4.65
Weirton,W.Va. W6 ..... 4.65
Youngstown R2, U5 ..... 4.65

BARS, H.R. Leaded Alloy

Warren,O. C17 ..... 6.325

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ..... 5.575
Bridgeport,Conn. N19 .. 5.725
Buffalo R2 ..... 5.575
Canton,O. R2, T7 ..... 5.575
Clairton,Pa. U5 ..... 5.575
Detroit R7 ..... 5.575
Ecorse,Mich. G5 ..... 5.675
Fontana,Calif. K1 ..... 6.625
FairlessHills,Pa. U5 ..... 5.725
Gary,Ind. U5 ..... 5.575
Houston 85 ..... 5.825
Ind.Harbor,Ind. I-2,Y1 .. 5.575
Johnstown,Pa. B2 ..... 5.575
KansasCity,Mo. 85 ..... 5.825
Lackawanna,N.Y. B2 .. 5.575
LosAngeles B3 ..... 6.625
Massillon,O. R2 ..... 5.575
Midland,Pa. C18 ..... 5.575
S.Chicago, R2, U5, W14 .. 5.575
S.Duquesne,Pa. U5 ..... 5.575
Struthers,O. Y1 ..... 5.575
Warren,O. C17 ..... 5.575
Youngstown U5 ..... 5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 6.80
Bessemer,Ala. T2 ..... 6.80
Bethlehem,Pa. B2 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Cleveland R2 ..... 6.80
Ecorse,Mich. G5 ..... 6.90
Fairfield,Ala. T2 ..... 6.80
Fontana,Calif. K1 ..... 7.50
Gary,Ind. U5 ..... 6.80
Houston 85 ..... 7.05
Ind.Harb.,Ind. I-2, Y1 .. 6.80
Johnstown,Pa. B2 ..... 6.80
KansasCity,Mo. 85 ..... 7.05
Lackawanna,N.Y. B2 .. 6.80
LosAngeles B3 ..... 7.50
Pittsburgh J5 ..... 6.80
Seattle B3 ..... 7.55
S.Chicago W14 ..... 6.80
S.Duquesne,Pa. U5 ..... 6.80
S.SanFrancisco B3 ..... 7.55
Struthers,O. Y1 ..... 6.80
Warren,O. R2 ..... 6.80
Youngstown U5 ..... 6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 ..... 4.80

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ..... 4.65
Atlanta A11 ..... 4.85
Fontana,Calif. K1 ..... 5.35
Niles,Calif. P1 ..... 5.00
Pittsburgh J5 ..... 4.30
Portland,Oreg. O4 ..... 5.05
SanFrancisco S7 ..... 5.05

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 ..... 5.65
Gary,Ind. U5 ..... 5.65
Houston 85 ..... 5.90
KansasCity,Mo. 85 ..... 5.90
Youngstown U5 ..... 5.65

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18 ..... 8.325
Camden,N.J. P13 ..... 8.50
Chicago W18 ..... 8.325
Cleveland C20 ..... 8.325
Monaca,Pa. S17 ..... 8.325
Newark,N.J. W18 ..... 8.50
SpringCity,Pa. K3 ..... 8.50
Warren,O. C17 ..... 8.325

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ..... 5.90
BeaverFalls,Pa. M12, R2 .. 5.90
Buffalo B5 ..... 5.95
Camden,N.J. P13 ..... 6.35
Carnegie,Pa. C12 ..... 5.90
Chicago W18 ..... 5.90
Cleveland A7, C20 ..... 5.90
Detroit R7 ..... 5.90
Detroit B5, P17 ..... 6.10
Donora,Pa. A7 ..... 5.90
Elyria,O. W18 ..... 5.90
FranklinPark,Ill. N5 ..... 5.90
Gary,Ind. R2 ..... 5.90
GreenBay,Wis. F7 ..... 5.90
Hammond,Ind. L2, M13 .. 5.90
Hartford,Conn. R2 ..... 6.40
Harvey,Ill. B5 ..... 5.90
LosAngeles R2, S30 ..... 7.35
Mansfield,Mass. B5 ..... 6.45
Massillon,O. R2, R8 ..... 5.90
Midland,Pa. C18 ..... 5.90
Monaca,Pa. S17 ..... 5.90
Newark,N.J. W18 ..... 6.35
NewCastle,Pa.(17) B4 .. 5.90
Pittsburgh J5 ..... 5.90
Plymouth,Mich. P5 ..... 6.15
Putnam,Conn. W18 ..... 6.45
Readville,Mass. C14 ..... 6.45
S.Chicago,Ill. W14 ..... 5.90
SpringCity,Pa. K3 ..... 6.35
Struthers,O. Y1 ..... 5.90
Waukegan,Ill. A7 ..... 5.90
Worcester,Mass. W19 .. 6.35
Youngstown F3, Y1 ..... 5.90

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md. C19 .. 5.15

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ..... 7.425
BeaverFalls,Pa. M12,R2 .. 7.425
Bethlehem,Pa. B2 ..... 7.425
Buffalo B5 ..... 7.425
Camden,N.J. P13 ..... 7.60
Canton,O. T7 ..... 7.425
Carnegie,Pa. C12 ..... 7.425
Chicago W18 ..... 7.425
Cleveland A7, C20 ..... 7.425
Detroit R7 ..... 7.425
Detroit B5, P17 ..... 7.625
Donora,Pa. A7 ..... 7.425
Elyria,O. W8 ..... 7.425
Gary,Ind. R2 ..... 7.425
GreenBay,Wis. F7 ..... 7.425
Hammond,Ind. L2, M13 .. 7.425
Hartford,Conn. R2 ..... 7.725
Harvey,Ill. B5 ..... 7.425
Lackawanna,N.Y. B2 .. 7.425
LosAngeles S30 ..... 9.10
Mansfield,Mass. B5 ..... 7.725
Massillon,O. R2, R8 ..... 7.425
Midland,Pa. C18 ..... 7.425
Monaca,Pa. S17 ..... 7.425
Newark,N.J. W18 ..... 7.60
Plymouth,Mich. P5 ..... 7.625
S.Chicago W14 ..... 7.425
SpringCity,Pa. K3 ..... 7.60
Struthers,O. Y1 ..... 7.425
Warren,O. C17 ..... 7.425
Waukegan,Ill. A7 ..... 7.425
Worcester,Mass. A7 ..... 7.725
Youngstown F3, Y1 ..... 7.425

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 ..... 4.65
Altanta A11 ..... 4.85
Birmingham C15 ..... 4.65
Buffalo R2 ..... 4.65
Cleveland R2 ..... 4.65
Ecorse,Mich. G5 ..... 4.75
Emeryville,Calif. J7 ..... 5.40
Fairfield,Ala. T2 ..... 4.65
FairlessHills,Pa. U5 ..... 4.80
Fontana,Calif. K1 ..... 5.35
Ft.Worth,Tex.(42) T4 .. 5.10
Gary,Ind. U5 ..... 4.65
Houston 85 ..... 4.90

Ind.Harbor,Ind. I-2, Y1 4.65
Johnstown,Pa. B2 ..... 4.65
Joliet,Ill. P22 ..... 4.65
KansasCity,Mo. S5 ..... 4.90
Lackawanna,N.Y. B2 ..... 4.65
LosAngeles B3 ..... 5.35
Milton,Pa. M18 ..... 4.65
Minnequa,Colo. C10 ..... 5.10
Niles,Calif. P1 ..... 5.00
Pittsburg,Calif. C11 ..... 5.35
Pittsburgh J5 ..... 4.65
Portland,Oreg. O4 ..... 5.40
SandSprings,Okla, S5 ..... 5.15
Seattle B3, N14 ..... 5.40
S.Chicago R2 ..... 4.65
S.Duquesne,Pa. U5 ..... 4.65
S.SanFrancisco B3 ..... 5.40
SparrowsPoint,Md. B2 ..... 4.65
Sterling,Ill.(1) N15 ..... 4.65
Sterling,Ill. N15 ..... 4.75
Struthers,O. Y1 ..... 4.65
Torrance,Calif. C11 ..... 5.35
Youngstown R2, U5, Y1 4.65

BARS, Reinforcing (Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2 6.15
KansasCity,Kans. S5 ..... 6.45
Lackawanna,N.Y. B2 ..... 6.17
Marion,O. P11 ..... 5.90
Pittsburgh U8 ..... 6.17
Seattle B3, N14 ..... 6.60
SparrowsPt. ½-1" B2 ..... 6.15
Williamsport, Pa. S19 ..... 6.00

RAIL STEEL BARS

Avis,Pa.(3) J8 ..... 4.25
ChicagoHts.(3) C2, I-2 ..... 4.55
ChicagoHts.(4) C2, I-2 ..... 4.65
Ft.Worth,Tex.(26) T4 ..... 5.10
Franklin,Pa. (3) F5 ..... 4.55
Franklin,Pa.(4) F5 ..... 4.65
Marion,O.(3) P11 ..... 4.50
Moline,Ill.(3) R2 ..... 4.65
Tonawanda(3) B12 ..... 4.50
Tonawanda(4) B12 ..... 4.65
Williamsport,Pa.(3) S19 4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 11.50
Economy,Pa(D.R.)B14 14.30
Economy(Staybolt)B14 14.65
McK.Rks. (S.R.) L5 ..... 11.50
McK.Rks. (D.R.) L5 ..... 16.00
McK.Rks.(Staybolt) L5 17.00

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ..... 4.325
Allenport,Pa. P7 ..... 4.325
Ashland,Ky.(8) A10 ..... 4.325
Cleveland J5, R2 ..... 4.325
Conshohocken,Pa. A3 ..... 4.375
Detroit(8) M1 ..... 4.425
Dravosburg,Pa. U5 ..... 4.325
Ecorse,Mich. G5 ..... 4.425
Fairfield,Ala. T2 ..... 4.325
FairlessHills,Pa. U5 ..... 4.375
Fontana,Calif. K1 ..... 5.075
Gary,Ind. U5 ..... 4.325
Geneva,Utah C11 ..... 4.425
GraniteCity,Ill. G4 ..... 4.525
Ind.Harbor,Ind. I-2, Y1 4.325
Kokomo,Ind. C16 ..... 4.425
Lackawanna,N.Y. B2 ..... 4.325
Mansfield,O. E6, (37) 4.325
Munhall,Pa. U5 ..... 4.325
Newport,Ky.(8) N9 ..... 4.325
Niles,O. N12 ..... 4.325
Pittsburg,Calif. C11 ..... 5.025
Pittsburgh J5 ..... 4.325
Portsmouth,O. P12 ..... 4.325
Riverdale,Ill. A1 ..... 4.325
Sharon,Pa. S3 ..... 4.325
S.Chicago,Ill. W14 ..... 4.325
SparrowsPoint,Md. B2 4.325
Steubenville,O. W10 ..... 4.325
Warren,O. R2 ..... 4.325
Weirton,W.Va. W6 ..... 4.325
Youngstown U5, Y1 ..... 4.325

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2 ..... 5.625
Kokomo,Ind. C16 ..... 5.475
Niles,O. N12 ..... 5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 ..... 7.20
Youngstown Y1 ..... 7.20

SHEETS, H.R.(14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 ..... 6.375
Conshohocken,Pa. A3 ..... 6.425
Dravosburg,Pa. U5 ..... 6.375
Ecorse,Mich. G5 ..... 6.475
Fairfield,Ala. T2 ..... 6.375
FairlessHills,Pa. U5 ..... 6.425
Fontana,Calif. K1 ..... 7.125
Gary,Ind. U5 ..... 6.375
Ind.Harbor,Ind. I-2, Y1 6.375
Lackawanna(35) B2 ..... 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
Sharon,Pa. S3 ..... 6.375
S.Chicago,Ill. U5 ..... 6.375
SparrowsPoint(36) B2 ..... 6.375
Warren,O. R2 ..... 6.375
Weirton,W.Va. W6 ..... 6.375
Youngstown U5, Y1 ..... 6.375

SHEET, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..... 4.575
Ind.Harbor,Ind. I-2 ..... 4.575

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 ..... 5.325
Cleveland J5, R2 ..... 5.325
Conshohocken,Pa. A3 ..... 5.375
Dravosburg,Pa. U5 ..... 5.325
Detroit M1 ..... 5.325
Ecorse,Mich. G5 ..... 5.425
Fairfield,Ala. T2 ..... 5.325
FairlessHills,Pa. U5 ..... 5.375
Follansbee,W.Va. F4 ..... 5.325
Fontana,Calif. K1 ..... 6.425
Gary,Ind. U5 ..... 5.325
GraniteCity,Ill. G4 ..... 5.525
Ind.Harbor,Ind. I-2, Y1 5.325
Lackawanna,N.Y. B2 ..... 5.325
Mansfield,O. E6 ..... 5.325
Middletown,O. A10 ..... 5.325
Newport,Ky. N9 ..... 5.325
Pittsburg,Calif. C11 ..... 6.275
Pittsburgh J5 ..... 5.325
Portsmouth,O. P12 ..... 5.325
SparrowsPoint,Md. B2 ..... 5.325
Steubenville,O. W10 ..... 5.325
Warren,O. R2 ..... 5.325
Weirton,W.Va. W6 ..... 5.325
Youngstown Y1 ..... 5.325

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 ..... 7.875
Dravosburg,Pa. U5 ..... 7.875
Ecorse,Mich. G5 ..... 7.975
FairlessHills,Pa. U5 ..... 7.925
Fontana,Calif. K1 ..... 8.975
Gary,Ind. U5 ..... 7.875
IndianaHarbor,Ind. Y1 7.875
Lackawanna(37) B2 ..... 7.875
Pittsburgh J5 ..... 7.875
SparrowsPoint(38) B2 ..... 7.875
Warren,O. R2 ..... 7.875
Weirton,W.Va. W6 ..... 7.875
Youngstown Y1 ..... 7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 ..... 5.825

SHEETS, Culvert (16 Gage)	**Cu**	**Cu Alloy**	**Fe**
Ashland,Ky. A10	6.90		...
Canton,O. R2	6.10	6.55	...
Dravosburg U5	6.10		...
Fairfield T2	6.10		...
Gary,Ind. U5	6.10	6.35	...
Ind.Harbor I-2	6.10	6.35	...
Kokomo,Ind. C16	6.20		...
MartinsFry. W10	6.10		...
Newport,Ky. N9	6.10	6.35	...
Pitts.,Calif. C11	6.85		...
SparrowsPt. B2	6.10		...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 ..... 7.15
Gary,Ind. U5 ..... 6.35
MartinsFry.,O. W10 ..... 6.35

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 ..... 5.85†
Ashland,Ky. A10 ..... 5.85†
Canton,O. R2 ..... 5.85†
Delphos,O. N16 ..... 6.60†
Dover,O. R1 ..... 5.85†
Dravosburg,Pa. U5 ..... 5.85†
Fairfield,Ala. T2 ..... 5.85†
Gary,Ind. U5 ..... 5.85*
GraniteCity,Ill. G4 ..... 6.05
Ind.Harbor,Ind. I-2 ..... 5.85†
Kokomo,Ind. C16 ..... 5.95†
MartinsFerry,O. W10 ..... 5.85*
Middletown,O. A10 ..... 5.85†
Newport,Ky. N9 ..... 5.85†
Niles,O. N12 ..... 6.85†
Pittsburg,Calif. C1 ..... 6.60*
SparrowsPt.,Md. B2 ..... 5.85†
Steubenville,O. W10 ..... 5.85†
Warren,O. R2 ..... 5.85†
Weirton,W.Va. W6 ..... 5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ..... 6.575

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 ..... 8.60
SparrowsPoint(39) B2 ..... 8.60

SHEETS, Galvannealed Steel

Canton,O. R2 ..... 6.25
Dravosburg,Pa. U5 ..... 6.25
Kokomo,Ind. C16 ..... 6.60
Newport,Ky. N9 ..... 6.25
Niles,O. N12 ..... 7.25

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 ..... 6.10
Middletown,O. A10 ..... 6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 ..... 6.70
Niles,O.(28) R2 ..... 6.70
Weirton,W.Va. W6 ..... 6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.50
Butler,Pa. A10 (type 2) 8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 ..... 5.90
Cleveland R2 ..... 5.90
Dravosburg,Pa. U5 ..... 5.90
Gary,Ind. U5 ..... 5.90
GraniteCity,Ill. G4 ..... 6.10
Ind.Harbor,Ind. I-2 ..... 5.90
Middletown,O. A10 ..... 5.90
Niles,O. N12 ..... 5.90
Youngstown Y1 ..... 5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..... 7.75
Ind.Harbor,Ind. I-2 ..... 7.75
Yorkville,O. W10 ..... 7.75

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 ..... 6.25
Mansfield,O. E6 ..... 6.25
Middletown,O. A10 ..... 6.25
Niles,O. N12 ..... 6.25
Weirton,W.Va. W6 ..... 6.25

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10 ..... 6.65

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Division H. K. Porter Co. Inc.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E. Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div. Sharon Steel Corp.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Division, H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Whickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala. (27) R2	4.325
Allenport,Pa. P7	4.325
Alton,Ill. L1	4.50
Ashland,Ky.(8) A10	4.325
Atlanta A11	4.525
Bessemer,Ala. T2	4.325
Birmingham C15	4.325
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.325
Conshohocken,Pa. A3	4.375
Detroit M1	4.425
Ecorse,Mich. G5	4.425
Fairfield,Ala. T2	4.325
Fontana,Calif. K1	5.075
Gary,Ind. U5	4.325
Ind.Harbor,Ind. I-2, Y1	4.325
Johnstown,Pa.(25) B2	4.325
Lackaw'na,N.Y.(24) B2	4.325
LosAngeles(25) B3	5.075
Milton,Pa. M18	4.325
Minnequa,Colo. C10	5.425
NewBritain(10) S15	4.325
N.Tonawanda,N.Y. B11	4.325
Pittsburg,Calif. C11	5.075
Portsmouth,O. P12	4.325
Riverdale,Ill. A1	4.325
SanFrancisco S7	5.05
Seattle(25) B3	5.325
Seattle N14	5.40
Sharon,Pa. S3	4.325
S.Chicago, Ill. W14	4.325
S.SanFrancisco(25) B3	5.075
SparrowsPoint,Md. B2	4.325
Sterling(1) N15	4.325
Sterling,Ill. N15	4.425
Torrance,Calif. C11	5.075
Warren,O. R2	4.325
Weirton W.Va. W6	4.325
Youngstown U5	4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.20
Fontana,Calif. K1	8.85
Gary,Ind. U5	7.20
Ind.Harbor,Ind. Y1	7.20
LosAngeles B3	8.40
Newport,Ky. N9	7.20
Sharon, Pa. S3	7.20
S.Chicago W14	7.20
Youngstown U5, Y1	7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.425
Conshohocken,Pa. A3	6.425
Ecorse,Mich. G5	6.525
Fairfield,Ala. T2	6.425
Fontana,Calif. K1	7.525
Gary,Ind. U5	6.425
Houston S5	6.675
Ind.Harbor,Ind. I-2, Y1	6.425
KansasCity,Mo. S5	6.675
Lackawanna,N.Y. B2	6.425
LosAngeles(25) B3	7.175
Seattle(25) B3	7.425
Sharon,Pa. S3	6.425
S.SanFrancisco(25) B3	7.175
SparrowsPoint,Md. B2	6.425
Warren,O. R2	6.425
Weirton,W.Va. W6	6.425
Youngstown U5, Y1	6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.575

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.25
Baltimore T6	6.25
Boston T6	6.80
Buffalo S40	6.25
Cleveland J5	6.25
Cleveland A7	6.25
Conshohocken,Pa. A3	6.30
Dearborn,Mich. D3	6.35
Detroit D2, M1, P20	6.35
Dover,O. G6	6.25
Ecorse,Mich. G5	6.35
Follansbee,W.Va. F4	6.25
Fontana,Calif. K1	8.00
Franklin Park,Ill. T6	6.35
Ind.Harbor,Ind. I-2	6.35
Ind.Harbor,Ind. Y1	6.25
Indianapolis C8	6.40
Lackawanna,N.Y. B2	6.25
LosAngeles C1	8.50
NewBedford,Mass. R10	6.70
NewBritain(10) S15	6.25
NewCastle,Pa. B4, E5	6.25
NewHaven,Conn. A7	7.00
NewHaven,Conn. D2	6.70
NewKensington,Pa. A6	6.25
Pawtucket,R.I. R3	6.90
Pawtucket,R.I. N8	6.80
Pittsburgh J5	6.25
Portsmouth,O. P12	6.25
Riverdale,Ill. A1	6.35
Rome,N.Y. (32) R6	6.25
Sharon,Pa. S3	6.25
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(31) F5	7.80
Wallingford,Conn. W2	6.70
Warren,O. R2, T5	6.25
Weirton,W.Va. W6	6.25
Worcester,Mass. A7	7.10
Youngstown Y1	6.25
Youngstown C8	6.25

STRIP, Cold-Rolled Alloy

Boston T6	13.80
Carnegie,Pa. S18	13.45
Cleveland A7	13.45
Dover,O. G6	13.45
FranklinPark,Ill. T6	13.45
Harrison,N.J. C18	13.45
Indianapolis C8	13.60
Pawtucket,R.I. N8	13.80
Sharon,Pa. S3	13.45
Worcester,Mass. A7	13.75
Youngstown C8	13.45

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7	9.10
Dearborn,Mich. D3	9.20
Dover,O. G6	9.30
Ecorse,Mich. G5	9.20

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.30	9.25	10.80	12.95	15.65
Boston T6	7.55	9.25	10.80	12.95	15.65
Bristol,Conn. W1	...	...	10.80	12.95	15.65
Carnegie, Pa. S18	...	8.95	10.50	12.65	....
Cleveland A7	7.00	8.95	10.50	12.65	15.35
Cleveland C7	...	8.95	10.50	12.65	15.35
Dearborn,Mich. D3	7.10	9.05	10.60	....	....
Detroit D2	7.10	9.05	10.60	12.75	....
Dover,O. G6	7.00	8.95	10.50	12.65	15.35
Follansbee,W.Va. F4	7.00	8.95	10.50**	....	....
FranklinPark,Ill. T6	7.10	8.95	10.50	12.65	15.35
Harrison,N.J. C18	...	...	10.80	12.95	15.65
Indianapolis C8	7.15	9.10	10.50	12.65	15.35
NewBritain,Conn.(10) S15	7.00	8.95	10.50	12.65	15.35
NewCastle,Pa. B4, E5	7.00	8.95	10.50	12.65	....
NewHaven,Conn. D2	7.45	9.25	10.80	12.95	....
NewKensington,Pa. A6	7.00	8.95	10.50	....	....
New York W3	...	9.25	10.80	12.95	15.65
Pawtucket,R.I. N8	7.55	9.25	10.80	12.95	15.35
Riverdale,Ill. A1	7.10	8.95	10.50	12.65	15.35
Rome,N.Y.(32) R6	7.00	8.95	10.50	12.65	15.35
Sharon,Pa. S3	7.00	8.95	10.50	12.65	15.35
Trenton,N.J. R5	...	9.25	10.80	12.95	15.65
Wallingford,Conn. W2	7.45	9.25	10.80	12.95	15.65
Warren,O. T5	7.00	8.95	10.50	12.65	15.35
Weirton,W.Va. W6	7.00	8.95	10.50	12.65	15.35
Worcester,Mass. T6	7.55	9.25	10.80	12.95	15.65
Worcester,Mass. A7	7.85	9.25	10.80	12.95	15.65
Youngstown C8	7.00	8.95	10.50	12.65	15.35

**0.065 C. max.

Spring Steel (Tempered)

Bristol,Conn. W1	...	...	14.40	17.60	....
Buffalo, W12	...	...	14.40	....	....
FranklinPark,Ill. T6	...	...	14.90	18.10	21.50
Harrison,N.J. C18	...	...	14.40	17.60	21.00
NewYork W3	...	...	14.40	17.60	21.00
Trenton,N.J. R5	...	...	14.40	17.60	21.00
Worcester,Mass. A7, T6	...	...	14.40	17.60	21.00
Worcester,Mass. W12	...	...	14.40	....	....
Youngstown C8	...	...	14.75	17.95	21.35

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. N12	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	10.70	11.70	12.60
GraniteCity,Ill. G4	8.80*	9.80*	10.40*	11.40*	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	...	10.10†	10.70†	11.70†	12.60†
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60
Zanesville,O. A10	...	10.10	10.70	11.70	12.60

	Transformer Grade			
H.R. SHEETS (22 Ga., cut lengths)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	....	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80‡	13.35‡	13.85‡	14.85‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.85	17.45	17.95	13.55‡
Butler,Pa. A10	...	....	17.45	17.95	....
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	13.55
Warren,O. R2	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. §Coils, ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.90	$8.15	$8.55
Dravosburg, Pa. U5	7.90	8.15	8.55
Fairfield,Ala. T2	8.00	8.25	8.65
FairiessHills,Pa. U5	8.00	8.25	8.65
Gary,Ind. U5	7.90	8.15	8.55
GraniteCity,Ill. G4	8.00	8.25	8.65
IndianaHarbor,Ind. I-2, Y1	7.90	8.15	8.55
Niles,O. R2	7.90	8.15	8.55
Pittsburg,Calif. C11	8.65	8.90	9.30
SparrowsPoint,Md. B2	8.00	8.25	8.65
Weirton,W.Va. W6	7.90	8.15	8.55
Yorkville,O. W10	7.90	8.15	8.55

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa,Pa. J5	6.575	....	....
Niles,O. R2	7.075	7.275	7.475

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.20	$9.45
Dravosburg,Pa. U5	9.20	9.45
Fairfield,Ala. T2	9.30	9.55
Fairless,Pa. U5	9.30	9.55
Gary,Ind. U5	9.20	9.45
Ind.Har. I-2, Y1	9.20	9.45
Pitts.,Calif. C11	9.95	10.20
Sp.Pt.,Md. B2	9.30	9.55
Weirton,W.Va. W6	9.20	9.45
Yorkville,O. W10	9.20	9.45

BLACK PLATE, (Base Box)

Aliquippa,Pa. J5	$7.00
Dravosburg,Pa. U5	7.00
Fairfield,Ala. T2	7.10
FairlessHills,Pa. U5	7.10
Gary,Ind. U5	7.00
GraniteCity,Ill. G4	7.10
Ind.Harbor,Ind. I-2, Y1	7.00
Niles,O. R2	7.00
Pittsburg,Calif. C11	7.75
SparrowsPoint,Md. B2	7.10
Warren,O. R2	7.00
Weirton,W.Va. W6	7.00
Yorkville,O. W10	7.00

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	6.65
Gary,Ind. U5	6.65
GraniteCity,Ill. G4	6.75
Ind.Harbor,Ind. Y1	6.65
Yorkville,O. W10	6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$8.70
Gary,Ind. U5	8.70

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$9.15

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	6.25
Aliquippa,Pa. J5	6.25
Alton,Ill. L1	6.425
Atlanta A11	6.45
Bartonville,Ill. K4	6.35
Buffalo W12	6.25
Chicago W13	6.25
Cleveland A7	6.25
Crawfordsville,Ind. M8	6.35
Donora,Pa. A7	6.25
Duluth,Minn. A7	6.25
Fairfield,Ala. T2	6.25
Fostoria,O.(24) S1	6.45
Houston S5	6.50
Jacksonville,Fla. M8	6.77
Johnstown,Pa. B2	6.25
Joliet,Ill. A7	6.25
KansasCity,Mo. S5	6.50
Kokomo,Ind. C16	6.35
LosAngeles B3	7.20
Minnequa,Colo. C10	6.50
Monessen,Pa. P7	6.25
Newark 6-8 ga. I-1	6.90
N. Tonawanda B11	6.25
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Portsmouth,O. P12	6.25
Rankin,Pa. A7	6.25
S.Chicago,Ill. R2	6.25
S.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Sterling,Ill.(1) N15	6.25
Sterling,Ill. N15	6.35
Struthers,O. Y1	6.25
Waukegan,Ill. A7	6.25
Worcester,Mass. A7	6.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	7.90
Alton,Ill. L1	8.075
Bartonville,Ill. K4	8.00
Buffalo W12	7.90
Cleveland A7	7.90
Donora,Pa. A7	7.90
Duluth,Minn. A7	7.90
Fostoria,O. S1	7.95
Johnstown,Pa. B2	7.90
LosAngeles B3	8.85
Milbury,Mass.(12) N6	8.20
Minnequa,Colo. C10	8.15
Monessen,Pa. P16	7.90
Muncie,Ind. I-7	8.10
Palmer,Mass. W12	8.20
Pittsburg,Calif. C11	8.85
Portsmouth,O. P12	7.90
Roebling,N.J. R5	8.20
S.Chicago,Ill. R2	7.90
S.SanFrancisco C10	8.85
SparrowsPt.,Md. B2	8.00
Struthers,O. Y1	7.90
Trenton,N.J. A7	8.20
Waukegan,Ill. A7	7.90
Worcester A7,J4,T6,W12	8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	7.60
Alton,Ill. L1	7.775
Buffalo W12	7.60
Cleveland A7	7.60
Donora,Pa. A7	7.60
Duluth,Minn. A7	7.60
Johnstown,Pa. B2	7.60
KansasCity,Mo. S5	7.85
LosAngeles B3	8.55
Minnequa,Colo. C10	7.775
Monessen,Pa. P16	7.60
NewHaven,Conn. A7	7.90
Palmer,Mass. W12	7.90
Pittsburg,Calif. C11	8.55
Portsmouth,O. P12	7.60
Roebling,N.J. R5	7.90
S.Chicago,Ill. R2	7.60
S.SanFrancisco C10	8.55
SparrowsPoint,Md. B2	7.70
Struthers,O. Y1	7.60
Trenton,N.J. A7	7.90
Waukegan,Ill A7	7.60
Worcester,Mass. A7	7.90

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	12.725
Bartonville,Ill. K4	12.65
Buffalo W12	12.55
Chicago W13	12.55
Cleveland A7	12.55
Crawfordsville,Ind. M8	12.65
Fostoria,O. S1	12.55
Jacksonville,Fla. M8	13.08
Johnstown,Pa. B2	12.55
Kokomo,Ind. C16	12.55
Minnequa,Colo. C10	12.30
Monessen,Pa. P16	12.55
Muncie,Ind. I-7	12.75
Palmer,Mass. W12	12.85
Roebling,N.J. R5	12.85
S.SanFrancisco C10	12.90
Waukegan,Ill. A7	12.55
Worcester,Mass.A7,T6	12.85

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	10.70
Buffalo W12	10.70
Johnstown,Pa. B2	10.70
Minnequa,Colo. C10	10.825
Monessen,Pa. P16	10.70
Muncie,Ind. I-7	10.90
Pittsburg,Calif. C11	11.50
Portsmouth,O. P12	10.70
Roebling,N.J. R5	11.00
SparrowsPt., Md. B2	10.80

ROPE WIRE (A)

Bartonville,Ill. K4	10.55
Buffalo W12	10.55
Fostoria,O.(23) S1	10.55
Johnstown,Pa. B2	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.55
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.55
SparrowsPt. B2	10.55
Struther,O. Y1	10.55
Worcester,Mass. J4	10.55

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead

Bartonville, Ill. K4	14.15
Monessen, Pa. P16	14.20
Roebling, N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson Ind. G6	9.00
Baltimore T6	9.30
Buffalo W12	9.00
Cleveland A7	9.00
Crawfordsville, Ind. M8	9.00
Dover, O. G6	9.00
Fostoria, O. S1	9.00
Franklin Park, Ill. T6	9.10
Kokomo, Ind. C16	9.00
Massillon, O. R8	9.00
Milwaukee C23	9.20
Monessen, Pa. P16	9.00
Pawtucket, R.I. N8	9.30
Riverdale, Ill. A1	9.10
Rome, N.Y. R6	9.00
Trenton, N.J. R5	9.30
Worcester A7, T6, W12	9.30

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
Alabama City, Ala. R2	152
Aliquippa, Pa. J5	152
Atlanta A11	154
Bartonville, Ill. K4	154
Chicago, Ill. W13	152
Cleveland A9	157
Crawfordsville, Ind. M8	154
Donora, Pa. A7	152
Duluth, Minn. A7	152
Fairfield, Ala. T2	152
Galveston, Tex. D7	157
Houston, Tex. S5	157
Johnstown, Pa. B2	152
Joliet, Ill. A7	152
Kansas City, Mo. S5	157
Kokomo, Ind. C16	154
Minnequa, Colo. C10	157
Monessen, Pa. P7	152
Pittsburg, Calif. C11	171
Rankin, Pa. A7	152
S. Chicago, Ill. R2	152
Sparrows Pt., Md. B2	154
Sterling, Ill. (1) N15	152
Worcester, Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken, Pa. A3	$9.05
Wheeling, W.Va. W10	9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
Aliquippa, Pa. J5	152
Atlanta A11	154
Bartonville, Ill. K4	154
Crawfordsville, Ind. M8	154
Donora, Pa. A7	152
Duluth, Minn. A7	152
Fairfield, Ala. T2	152
Johnstown, Pa. B2	152
Joliet, Ill. A7	152
Kokomo, Ind. C16	154
Minnequa, Colo. C10	157
Monessen, Pa. P7	152
Pittsburg, Calif. C11	171
Rankin, Pa. A2	152
Sparrows Pt., Md. B2	154
Sterling, Ill. (1) N15	152
Worcester, Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
Alabama City, Ala. R2	$9.35
Bartonville, Ill. K4	9.45
Buffalo W12	9.35
Crawfordsville, Ind. M8	9.46
Donora, Pa. A7	9.35
Duluth, Minn. A7	9.35
Johnstown, Pa. B2	9.35
Joliet, Ill. A7	9.35
Kokomo, Ind. C16	9.45
Los Angeles B3	10.14
Minnequa, Colo. C10	9.60
Pittsburg, Calif. C11	10.43
S. Chicago, Ill. R2	9.35
Sparrows Pt., Md. B2	9.45
Sterling, Ill. N15	9.35

Coil No. 6500 Stand.	
Alabama City, Ala. R2	$9.65
Bartonville, Ill. K4	9.75
Buffalo W12	9.60
Crawfordsville, Ind. M8	9.75
Donora, Pa. A7	9.65
Duluth, Minn. A7	9.65
Johnstown, Pa. B3	9.65
Joliet, Ill. A7	9.65
Kokomo, Ind. C16	9.75
Los Angeles B3	10.45
Minnequa, Colo. C10	9.90
Pittsburg, Calif. C11	10.13
S. Chicago, Ill. R2	9.65
Sparrows Pt., Md. B2	9.75
Sterling, Ill. N15	9.65

Coil No. 6500 Interim	
Alabama City, Ala. R2	$9.70
Bartonville, Ill. K4	9.80
Buffalo W12	9.70
Crawfordsville, Ind. M8	9.80
Donora, Pa. A7	9.70
Duluth, Minn. A7	9.70
Johnstown, Pa. B2	9.70
Joliet, Ill. A7	9.70
Kokomo, Ind. C16	9.80
Los Angeles B3	10.50
Minnequa, Colo. C10	9.95
Pittsburg, Calif. C11	10.50
S. Chicago, Ill. R2	9.70
Sparrows Pt., Md. B2	9.80
Sterling, Ill. N15	9.70

WIRE, Barbed

	Col.
Alabama City, Ala. R2	.175**
Aliquippa J5	172§
Atlanta A11	181
Bartonville, Ill. K4	181
Crawfordsville, Ind. M8	181
Donora, Pa. A7	175†
Duluth, Minn. A7	175†
Fairfield, Ala. T2	175†
Houston, Tex. S5	180†
Johnstown, Pa. B2	179*
Joliet, Ill. A7	175†
Kansas City, Mo. S5	180†
Kokomo, Ind. C16	177†
Minnequa, Colo. C10	180**
Monessen, Pa. P7	179*
Pittsburg, Calif. C11	195†
Rankin, Pa. A7	175†
S. Chicago, Ill. R2	175**
S. San Francisco C10	195**
Sparrows Point, Md. B2	181*
Sterling, Ill. (1) N15	179*

WOVEN Fence, 9-15 Ga. Col.

Ala. City, Ala. R2	162**
Ala. City, 17 ga. R2	241**
Ala. City, 18 ga. R2	251**
Aliq'ppa, Pa. 9-14½ ga J5	165§
Atlanta A11	168
Bartonville, Ill K4	168
Crawfordsville, Ind. M8	168
Donora, Pa. A7	162†
Duluth, Minn. A7	162†
Fairfield, Ala T2	162†
Houston, Tex. S5	167†
Johnstown, Pa. (43) B2	166
Joliet, Ill. A7	162†
Kansas City, Mo. S5	167†
Kokomo, Ind. C16	164†
Minnequa, Colo. C10	167**
Monessen, Pa. 9 ga. P17	166*
Pittsburg, Calif. C11	185†
Rankin, Pa. A7	162†
S. Chicago, Ill. R2	162**
Sterling, Ill. (1) N15	166*

WIRE (16 Gage)

	An'ld Galv.	Stone
Ala. City R2	14.50	16.05**
Bartonville K4	14.60	16.50
Buffalo W12	14.50	
Cleveland A7	14.50	
Crawf'dsville M8	14.60	16.50
Fostoria, O. S1	14.60	16.15†
Johnstown B2	14.15	16.40*
Kokomo C16	14.60	16.15†
Minnequa C10	14.75	16.45**
Palmer, Mass W12	14.50	16.05*
Pitts., Calif. C11	14.85	16.40†
S. Chicago R2	14.50	16.05**
Sparrows Pt. B2	14.60	16.50*
Sterling (1) N15	14.50	16.45††
Waukegan A7	14.50	16.05†
Worcester A7	14.80	

WIRE, Merchant Quality (6 to 8 gage) An'ld Galv.

Ala. City, Ala. R2	7.40 7.80**
Aliquippa J5	7.40 7.925§
Atlanta A11	7.50 8.075
Bartonville (48) K4	7.50 8.075
Buffalo W12	7.40 8.80†
Cleveland A7	7.40
Crawfordsville M8	7.50 8.075
Donora, Pa. A7	7.40 7.80†
Duluth, Minn. A7	7.40 7.80†
Fairfield T2	7.40 7.80†
Houston, Tex. S5	7.65 8.05†
Jacks'ville, Fla. M8	7.90 8.475
Johnstown B2 (48)	7.40 7.975*
Joliet, Ill. A7	7.40 7.80†
Kansas City, Mo. S5	7.65 8.05†
Kokomo C16	7.50 7.90†
Los Angeles B3	8.35 8.925*
Minnequa C10	7.65 8.05**
Monessen P7 (48)	7.40 7.975*
Palmer, Mass. W12	7.70 8.10†
Pitts., Calif. C11	8.35 8.75†
Portsmouth, O. P12	7.40
Rankin A7	7.40 7.80†
S. Chicago R2	7.40 7.80**
S. San Fran. C10	8.35 8.75**
Spar'ws Pt. B2 (48)	7.50 8.075*
Str'ng (1) (48) N15	7.40 8.00††
Struthers, O. (48) Y1	7.40 7.90†
Worcester, Mass. A7	7.70

*Based on 12.50c zinc; †5c zinc; §10c zinc; ‡Less than 10c zinc; **Subject to zinc equalization extras. ††13c zinc.

BALE TIES, Single Loop Col.

Alabama City, Ala. R2	173
Atlanta A11	175
Bartonville, Ill. K4	175
Crawfordsville, Ind. M8	175
Donora, Pa. A7	173
Duluth, Minn. A7	173
Fairfield, Ala. T2	173
Joliet, Ill. A7	173
Houston S5	178
Kansas City, Mo. S5	178
Kokomo, Ind. C16	175
Minnequa, Colo. C10	178
S. Chicago R2	173
S. San Fran., Calif. C10	197
Sparrows Point, Md. B2	175
Sterling, Ill. (1) N15	173

FENCE POSTS

	Col.
Chicago Hts., Ill. C2, I-2	157
Duluth, Minn. A7	157
Franklin, Pa. F5	157
Huntington, W.Va. W7	157
Johnstown, Pa. B2	160
Marion, O. P11	157
Minnequa, Colo. C10	162
Moline Ill. R2	162
S. Chicago, Ill. R2	157
Tonawanda, N.Y. B12	157
Williamsport, Pa. S10	160

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts

Full-Size Body (cut thread)
- †½" x 6" and smaller 61
- Larger than ½" diam. and all diams. longer than 6" 55

Under-Size Body (rolled thread; not nutted):
- ½" x 6" and smaller. 61

Carriage, Machine & Lag Bolts, Hot Galvanized:
- ½" and smaller 42
- Larger than ½" diam. and all diams. longer than 6" 32

†½" x 4" and smaller and shorter are not nutted.

Lag Bolts
- All diams. x 6" and shorter 61
- All diams. longer than 6" 55

Plow, Tap & Blank Bolts
- ½" x 6" and smaller. 61
- Larger than ½" diam. and all diams, longer than 6" 55

Ribbed Neck, Carriage, Step, Elevator, Fitting-Up and Tire Bolts:
- All sizes 61

STOVE BOLTS, SLOTTED (nuts not attached; bulk)
- ¼" to ¼" diam. incl., 3" or shorter:
  - 25,000 to 199,999 pieces 61
  - 200,000 or more pieces 64
- ⅜" to ½" diam. incl., 3" or shorter:
  - 15,000 to 99,999 pieces 61
  - 100,000 or more pieces 64
- Longer than 3", any diam.:
  - 5000 to 99,999 pieces. 61
  - 100,000 or more pieces 64

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.95
⅞-in. under..List less 32%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.06	20.42
1¼	13	....	24.94	20.45
1½	13	23.31	27.57	22.61
1⅝	13	27.54	32.57	26.71
2	13	30.87	36.51	29.93
2¼	13	34.77	41.12	33.72
2½	12	37.73	44.63	36.60
2¾	12	41.57	49.16	40.31
2⅞	12	45.00	53.22	43.65
3	12	47.99	56.76	46.55

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer, Pa. U5	4.725	4.625	4.675	5.65
Ensley, Ala. T2	4.725	4.625	....	5.65
Fairfield, Ala. T2	....	....	....	5.65
Gary, Ind. U5	4.725	....	....	....
Huntington, W.Va. W7	....	....	....	5.65
Indiana Harbor, Ind. I-2	4.725	4.625	4.675	....
Johnstown, Pa. B2	....	....	....	(16)5.65
Lackawanna, N.Y. B2	4.725	4.625	....	5.65
Minnequa, Colo C10	4.725	4.625	....	6.15
Steelton, Pa. B2	4.725	4.625	....	....
Williamsport, Pa. S19	....	....	....	5.65

TIE PLATES

Fairfield, Ala. T2	5.625
Gary, Ind. U5	5.625
Ind. Harbor, Ind. I-2	5.625
Lackawanna, N.Y. B2	5.625
Minnequa, Colo. C10	5.625
Seattle B3	5.775
Steelton, Pa. B2	5.625
Torrance, Calif. C11	5.775

TRACK BOLTS (20) Treated

Cleveland R2	12.40
Kansas City, Mo. S5	12.40
Lebanon, Pa. B2	12.40
Minnequa, Colo. C10	12.40
Pittsburgh O3, P14	12.40
Seattle B3	12.90

AXLES

Ind. Harbor, Ind. S13	7.25
Johnstown, Pa. B2	7.25

JOINT BARS

Bessemer, Pa. U5	5.825
Fairfield, Ala. T2	5.825
Ind. Harbor, Ind. I-2	5.825
Joliet, Ill. U5	5.825
Lackawanna, N.Y. B2	5.825
Minnequa, Colo. C10	5.825
Steelton, Pa. B2	5.825

SCREW SPIKES

Cleveland R2	11.90
Pittsburgh O3	11.90

STANDARD TRACK SPIKES

Fairfield, Ala. T2	7.90
Ind. Harbor, Ind. I-2, Y1	7.90
Kansas City, Mo. S5	7.90
Lebanon, Pa. B2	7.90
Minnequa, Colo. C10	7.90
Pittsburgh J5	7.90
Seattle B3	8.40
S. Chicago, Ill. R2	7.90
Struthers, O. Y1	7.90
Youngstown R2	7.90

METAL POWDER

(Per pound f.o.b shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron: 98+% Fe, annealed. Unannealed:	9.25
Minus 100 mesh	11.75
Minus 35 mesh	8.25
Minus 20 mesh	9.00
Swedish, c.l.f. Camden, N. J., c.l. in bags.	9.50
Domestic (Swedish), f.o.b. Riverton, N.J., in bags	9.50
Canadian, f.o.b. Shipping point	9.50
Electrolytic iron: Melting stock, 99.9% Fe, irregular fragments of ¼ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	34.00
Unannealed (99+% Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh).	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns.	83.00-148.00
Aluminum: Atomized, 500 lb. drum frght. allowed	
Carlots	34.50
Ton lots	36.50
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	38.00-50.00†
Bronze, 5000-lb lots	61.25-64.50†
Copper: Electrolytic	56.75
Reduced	56.75
Lead	22.50
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	58.75-61.50†
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc, 5000-lb lots	18.75-32.50‡
Tungsten Melting grade, 99% 60 to 200 mesh:	Dollars
1000 lb and over	4.50
Less than 1000 lb	4.65
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni, **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago Base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Mild plow, 10.55c.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill and 0.45c for carbon, add 0.40c for alloy and 0.45c H.S.L.A.
(31) Widths over ⅝-in.; 6.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20a.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.35c higher.
(41) 9.10c for cut lengths.
(43) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(48) 6-7 Ga.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Ambridge, Pa. N2	6.5	...	10.5	...	13	...	14.5	...	14.5	...	14	...	16.5	...
Lorain, O. N3	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Youngstown Y1	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Alton, Ill. L1	...	...	....	....	....	....	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Benwood, W. Va. W10	16.5	+12	7.25	+18.25	+1.75	+26.25	17.5	0.25	20.5	4.75	23	7.75	25.5	7
Butler, Pa. F6	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Etna, Pa. N2	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Fairless Hills, Pa. N3	...	...	....	....	....	....	15.5	+1.75	18.5	2.75	21	5.75	23.5	7
Fontana, Calif. K1	...	...	....	....	....	....	6	+11.25	9	+7.25	11.5	+3.75	14	+2.5
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Lorain, O. N3	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sharon, Pa. S4	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sparrows Pt., Md. B2	15.5	+13	7	+18.5	+1.5	+26	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Youngstown R2, Y1	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Wheatland, Pa. W9	17.5	+11	9	+16.5	0.5	+24	17.5	0.25	20.5	4.25	23	7.75	25.5	9

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Alton, Ill. L1	24	8	24.5	8.5	26	8.75	26	8.75	....	...	....	...
Benwood, W. Va. W10	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Etna, Pa. N2	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Fairless Hills, Pa. N3	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Fontana, Calif. K1	14.5	+1.5	15	+1	16.5	+0.75	16.5	+0.75	7	+10.75	7	+10.75
Ind. Harbor, Ind. Y1	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Lorain, O. N3	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Sharon, Pa. M6	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....	...
Sparrows Pt., Md. B2	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Youngstown R2, Y1	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Wheatland, Pa. W9	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75

*Galvanized pipe discounts based on current price of zinc (13.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. Bars; H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
201	17.00	21.50	....	....	31.00	....	....	42.25	39.00
202	18.25	24.00	31.00	36.25	33.50	36.75	38.75	42.50	42.50
301	17.75	22.25	....	36.75	32.00	38.00	....	44.25	41.00
302	19.00	24.75	32.00	37.25	34.50	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	38.25	40.25	47.00	47.00
303	....	26.75	34.75	40.00	....	41.00	....	....	....
304	20.25	26.00	33.75	39.00	37.25	40.25	43.00	47.25	47.25
304L	....	....	38.75	44.00	42.25	45.25	48.00	52.25	52.25
305	21.75	28.25	....	39.50	40.25	40.25	43.50	50.25	50.25
308	22.00	29.00	38.50	44.25	41.25	45.50	49.75	52.00	52.00
309	29.50	38.25	46.75	53.50	53.50	54.75	58.25	67.00	67.00
309S	31.50	41.00	51.00	59.00	58.50	60.25	63.75	74.00	74.00
310	37.25	48.00	62.25	72.25	68.50	73.50	75.25	78.75	78.75
314	....	....	....	....	....	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	60.75	64.00	68.25	68.25
316L	....	....	56.25	64.75	63.25	65.75	69.25	73.25	73.25
317	37.25	48.25	62.75	72.75	73.50	74.50	77.00	83.75	83.75
321	25.00	32.00	38.25	44.00	44.25	45.25	49.25	54.25	54.25
18-8CbTa	29.25	38.00	45.75	52.25	53.25	53.50	58.00	66.50	66.50
403	....	....	28.75	32.75	....	34.00	36.25	....	44.00
405	17.50	23.00	26.75	31.00	32.25	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	30.50	31.75	36.25	36.25
416	....	....	....	26.00	30.00	....	31.00	....	....
420	23.50	30.25	31.00	36.00	37.75	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	31.00	32.25	36.75	36.75
430F	....	....	26.50	30.50	....	31.50	....	....	....
431	16.00	20.50	26.50	30.50	29.75	31.50	33.00	38.00	38.00
446	....	....	35.50	40.50	53.25	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co., Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base, 10%	Plates, Carbon Base, 20%	Sheets, Carbon Base, 20%
Stainless:			
302	....	....	30.50
304	30.30	36.05	32.50
304L	32.30	37.95	....
310	41.30	47.00	....
316	35.50	41.40	47.00
316-L	40.00	46.10	....
316-CB	41.15	48.45	....
321	32.00	37.75	37.25
347	34.40	41.40	48.25
405	25.80	33.35	....
410	25.30	32.85	....
430	25.30	32.85	....
Inconel	49.45	65.45	....
Nickel	41.05	55.65	....
Nickel, Low Carbon	43.25	60.05	....
Monel	42.35	56.35	....
Copper*	....	....	46.00

	Strip, Carbon Base, Cold Rolled, 10%	Strip, Carbon Base, Cold Rolled, Both Sides
Copper*	30.00	38.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	5%Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.090
18.25	4.25	1	4.75	...	2.305-2.475
18	4	2	9	...	2.675-2.6775
18	4	2	....	...	1.765
18	4	1	....	...	1.600
13.75	3.75	2	5	...	2.245
13.5	4	3	....	...	1.865
9	3.5	..	....	...	1.180
6	4	2	....	5	1.105
6	4	3	....	6	1.350
1.5	4	1	....	8.5	0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	54.50	55.00‡	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00	....
Woodward,Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	58.50	59.00	59.50	60.00
Tonawanda,N.Y. W12	58.50	59.00	59.50	60.00
N.Tonawanda,N.Y. T9	....	59.00	59.50	60.00
Boston, deld.	69.15	69.65	70.15	....
Rochester,N.Y. deld.	61.52	62.02	62.52	....
Syracuse,N.Y. deld.	62.62	63.12	63.62	....
Chicago District				
Chicago I-3	58.50	59.00	59.00	59.50
Gary,Ind. U5	58.50	....	59.00	....
S.Chicago R2	58.50	....	59.00	....
S.Chicago,Ill. Y1	58.50	59.00	59.00	59.50
S.Chicago,Ill. U5, W14	58.50	....	59.00	59.50
Milwaukee, deld.	60.67	61.17	61.17	61.67
Muskegon,Mich. deld.	....	65.30	65.30	....
Cleveland District				
Cleveland A7, R2	58.50	59.00	59.00	59.50
Akron,O., deld.	61.25	61.75	61.75	62.25
Lorain,O. N3	58.50	....	....	59.50
Mid-Atlantic District				
Bethlehem,Pa. B2	60.50	61.00	61.50	62.00
NewYork, deld.	....	64.78	65.28	....
Newark, deld.	63.52	64.02	64.52	65.02
Birdsboro,Pa. B10	60.50	61.00	61.50	62.00
Chester,Pa. P14	60.50	61.00	61.50	....
Philadelphia, deld.	62.16	62.66	63.16	....
Steelton,Pa. B2	60.50	61.00	61.50	62.00
Swedeland,Pa. A3	60.50	61.00	61.50	62.00
Philadelphia, deld.	62.16	62.66	63.16	63.66
Troy,N.Y. R2	60.50	61.00	61.50	62.00
Pittsburgh District				
NevilleIsland,Pa. P6	58.50	59.00	59.00	....
Pittsburgh (N&S sides), Aliquippa, deld.	....	60.37	60.37	60.87
McKeesRocks, deld.	....	60.04	60.04	60.54
Lawrenceville,Homestead, Wilmerding, Monaca, deld.	....	60.66	60.66	61.16
Verona,Trafford, deld.	60.69	61.19	61.19	61.69
Brackenridge, deld.	60.95	61.45	61.45	61.95
Bessemer,Pa. U5	58.50	....	59.00	59.50
Clairton,Rankin,S.Duquesne,Pa. U5	58.50	....	....	....
McKeesport,Pa. N3	58.50	....	....	59.50
Midland,Pa. C18	58.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	59.00	....
Sharpsville,Pa. S6	58.50	....	59.00	59.50
Youngstown Y1	....	....	59.00	59.50
Youngstown U5	58.50	....	....	59.50
Mansfield,O., deld.	63.40	....	63.90	64.40
Duluth I-3	58.50	59.00	59.00	59.50
Erie,Pa. I-3	58.50	59.00	59.00	59.50
Everett,Mass. E1	62.00	62.50	63.00	....
Fontana,Calif. K1	64.50	65.00	....	....
Geneva,Utah C11	58.50	59.00	....	....
GraniteCity,Ill. G4	60.40	60.90	61.40	....
Ironton,Utah C11	58.50	59.00	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	60.50	61.00	61.50	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	58.50	59.00	59.00	59.50
Cincinnati, deld.	64.26	64.76	....	....

*Phos. 0.51-0.75%; $56. Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	$67.50
Buffalo H1	68.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$85.50
Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2)	90.00
Keokuk, O.H. & Fdry, 12½ lb pigiets, 16% Si, frgt allowed K2	93.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$72.50
Steelton,Pa. B2 (Phos. 0.035% max)	66.50
Philadelphia, deld.	70.05
Troy,N.Y. R2 (Phos. 0.035% max)	66.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 25 cents per 100 lb except: Buffalo, Cleveland, Erie, 30 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Birmingham, Chattanooga, Jackson, 15 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	...	7.42	9.39	....	7.63	7.49	9.48
Baltimore	7.03	8.32	8.37	....	7.65	...	7.61	8.62[2]	13.44	7.93	7.21	8.87
Birmingham	6.80	7.90	8.85	....	7.06	...	7.08	9.35	....	7.28	6.99	9.10
Boston	7.70	8.81	10.27	45.67	7.96	...	7.83	9.53	14.45	8.13	7.89	9.36
Buffalo	6.80	8.05	9.77	....	7.15	...	7.10	7.90	13.10	7.40	7.15	8.70
Chattanooga	6.95	8.10	8.60	....	7.20	...	7.20	9.18	....	7.45	7.25	9.05
Chicago	6.80	8.09	8.50	49.05	7.06	...	7.08	7.75	12.85	7.28	6.99	8.46
Cincinnati	6.92	8.08	8.90	46.10	7.30	...	7.32	8.05	13.09	7.75	7.28	8.71
Cleveland	6.80	8.09	8.85	49.16	7.16	...	7.14	7.85	12.91	7.61	7.16	8.63
Detroit	6.99	8.28	8.78	43.50	7.34	...	7.36	8.04	13.05	7.75	7.27	8.65
Erie, Pa.	6.80	7.90	8.85	....	7.15	...	7.08	7.85	....	7.40	7.15	8.63
Houston	7.85	8.75	10.49	....	8.15	...	8.25	9.85	14.00	8.20	7.80	9.20
Jackson, Miss.	7.10	8.20	9.20	....	7.40	...	7.40	9.44	....	7.60	7.45	9.30
Los Angeles	8.05	10.00	11.00	....	8.35	...	8.05	11.25	14.25	8.30	8.05	10.25
Milwaukee	6.89	8.18	8.59	....	7.15	...	7.17	7.94	12.94	7.45	7.08	8.55
Moline, Ill.	7.15	8.44	8.85	....	7.41	...	7.43	8.10	....	7.63	7.34	...
New York	7.46	8.68	9.44	44.95	8.07	...	7.96	9.48	13.28	7.99	7.76	9.19
Norfolk, Va.	7.25	...	...	....	7.65	...	7.65	9.50	....	7.95	7.45	8.95
Philadelphia	7.14	8.42	9.35	45.98	7.67	9.02	7.64	8.46	13.16	7.74	7.37	8.69**
Pittsburgh	6.80	8.09	9.20	49.00	7.16	...	7.08	7.85	12.85	7.28	6.99	8.46
Portland, Oreg.	7.80	8.80	10.65	....	8.00	...	7.95	12.20	15.00	7.85	7.75	9.60
Richmond, Va.	7.00	...	9.47	....	7.65	...	7.70	8.85	....	7.95	7.20	9.10
St. Louis	7.09	8.38	9.19	43.89	7.35	...	7.37	8.14	13.14	7.68	7.28	8.75
St. Paul	7.46	8.59	9.16	....	7.72	...	7.74	8.51	13.51	7.94	7.65	9.12
San Francisco	8.10	9.65	10.15	51.65	8.35	...	8.05	11.20	14.25[2]	8.25	8.05	10.25
Seattle	8.55	10.40	10.80	54.00	8.65	...	8.35	11.70	14.60	8.30	8.20	10.10
Spokane	8.55	11.00[2]	10.80	....	9.05	...	8.35	11.80	15.35	8.30	8.20	10.60
Washington	7.50	8.79	7.97	....	8.12	...	8.08	9.09	....	8.40	7.68	9.34

Prices do not include gage extras; †prices include gage and coating extras (based on 12.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **¼-in. and heavier; ††as annealed; §§under ½-in.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 5000 lb except in Chicago, New York and Boston, 10 000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [5]—500 to 9999 lb; [3]—400 to 999 lb; [4]—4000 lb and over; [1]—1000 to 1999 lb; [6]—1000 lb and over; [7]—1500 to 3999 lb; [8]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10.000 lb and over.

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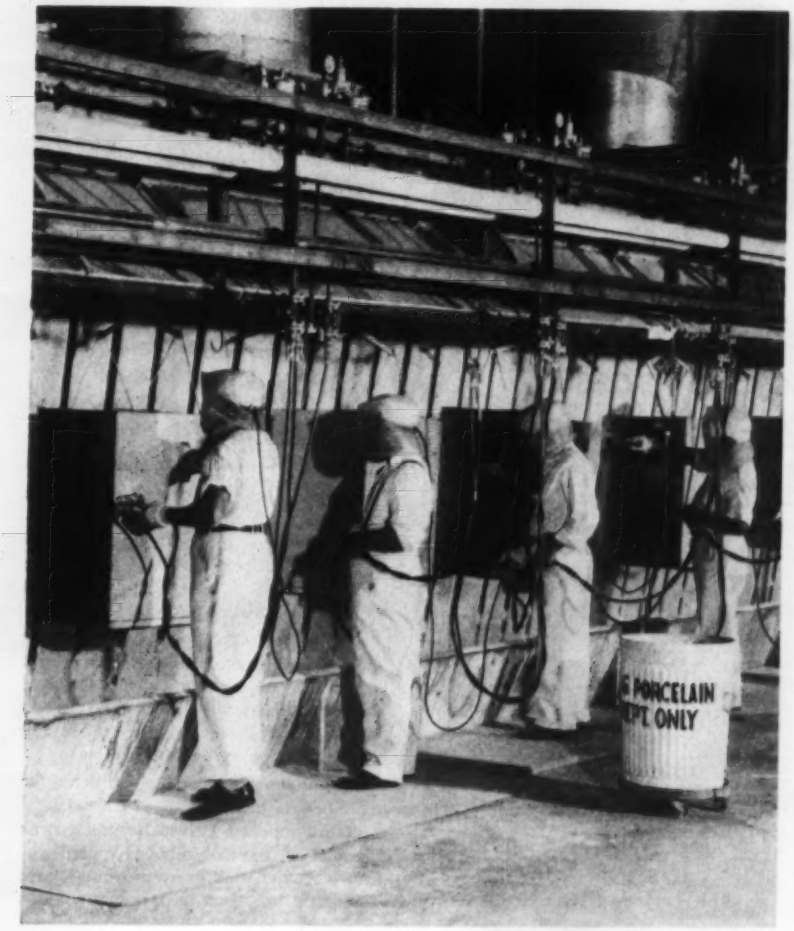


General Motors Corp.

Heavy demand for porcelain enameled products causes . . .

Enameling Iron To Expand

PRODUCERS of enameling iron are expressing confidence in construction and appliances, their chief markets, by increasing their capacities.

U. S. Steel Corp., Pittsburgh, will build a complete new line for the production of its vitrenamel sheets at its Irvin Works, Dravosburg, Pa. This will result in "considerable expansion in production by late 1956," company officials state. Inland Steel Co., Chicago, also has announced plans for a continuous normalizing line which will double its production of enameling sheets by the end of 1958. Armco Steel Corp., Middletown, O., says it has had an important increase in both cold and hot-rolled capacity for this product in the past year, and its over-all expansion program calls for even more.

What It Means—This expansion is going on despite several developments which could result in an easing in the market for this specialty product. In the last few years, there has been a trend toward synthetic enamels, which can be applied to regular grades of carbon steel. However, industry officials believe the trend is reversing and that vitreous enamels are once again recognized as the best coating. This assures them of a stable market, they feel.

The future market may be influenced by the development of low-temperature frits, which will permit the use of regular grades of carbon sheet. At present, enameling requires a temperature of about 1550° F, at which level ordinary steel will begin to sag. With the new frits, temperature can be reduced to about 1250° F, which regular carbon steel sheet can withstand.

Producers feel that this development is still far enough away from perfection to warrant their expansion of enameling sheet to meet the demands of the present and near-future market. In addition, they believe that the proper bonding between the metal and the coating can be obtained only with the special analysis of enameling iron.

Morale Booster—Producers have gained this confidence in their markets over the last few years largely because of the construction boom. Long used to decorate the exteriors of gas stations and drug stores, porcelain enamel has graduated to the multistory building as a curtain wall material. Because of the tonnage involved in even a small building, this segment of the market is pushing appliances as the No. 1 consumer.

But appliances are not to be counted out. They have been the bread-and-butter market for enameling sheet for years and will continue to be one of the most important users for a long time. Such heavy users as refrigerators, home freezers, ranges, washing machines and automatic dryers are enjoying a peak year.

Another significant segment of the market—formed metal plumbing ware—is also more than holding its own. As long as high-level residential construction continues, enameling iron producers see a steady market for heavier sheets.

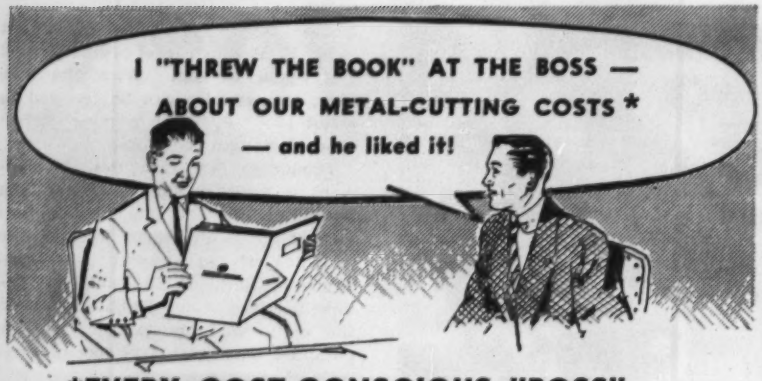
Sheets, Strip . . .

Sheet & Strip Prices, Pages 133 & 134

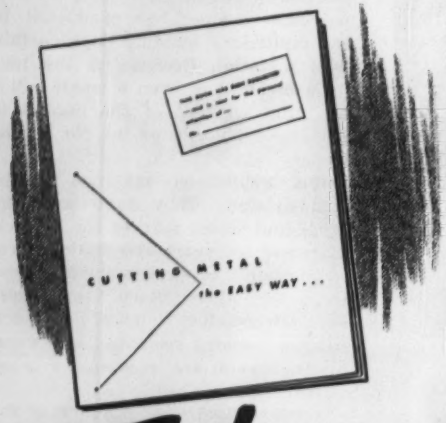
Most sheet steel sellers are sold out for the first quarter. Exceptions are where there has been delay in booking orders for certain products because of mill efforts to get commitments in better balance with shipments by year end.

Some producers are encouraging customers to send in inquiries on bare needs for the second quarter, so as to guide them in setting up schedules for that period. Here, mills are following previous policy. In general, sheetmakers are being offered far more tonnage than they can handle promptly.

Except for galvanized sheets, which are experiencing a seasonal lull, all sheet categories are under increasing pressure at Chicago. Demand is paced by that from the automobile



*EVERY COST-CONSCIOUS "BOSS" WILL LIKE THIS BOOK — if his company cuts any of these materials! —



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industry, which is pursuing terrific scheduling during November and December.

Hot-rolled sheets, particularly the wider sizes, are in tighter supply than cold rolled, evidence that there is strong demand in the market other than that arising on automotive account.

In New England, of all the flat-rolled products, only narrow cold-rolled carbon strip is in near supply-demand balance. The temporary withdrawal of several mills from the market on hot-rolled sheets in the Northeast is shifting the first quarter tonnage load.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 132

Bridge and highway requirements are mounting in New England, being bolstered substantially by Connecticut turnpike needs. Sixty-eight miles of the 128-mile highway will be of reinforced concrete.

Contracts already estimated call for 2250 tons of mat reinforcing and about 25,000 tons of mesh. General contracts closed to date take 13,500 tons of reinforcing bars for bridge and drainage structures.

Reinforcing bar prices are stronger in New England.

The proposed Priest Rapids power project on the Columbia river will require 23,000 tons of reinforcing bars. Bids will be taken in January.

Structural Shapes . . .

Structural Shape Prices, Page 132

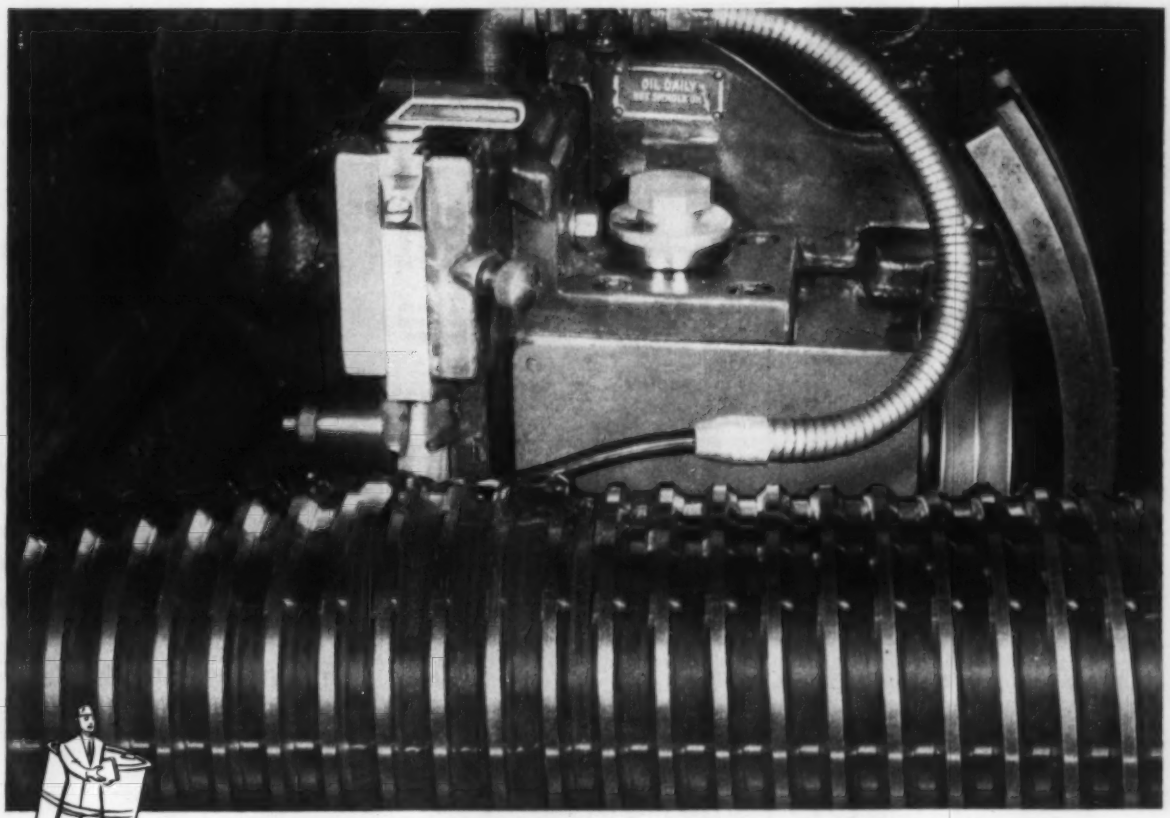
Structural steel demand continues brisk and diversified. Some fabricators are booked eight to nine months ahead. In some instances, jobs are being dropped before reaching the formal bidding stage because of the extended schedules of fabricating shops. The shortage of steel, in fact, is so acute that much heavy construction, such as barges, is being held back, and late-season construction is being curtailed.

Some fabricating shops are so hampered by the steel shortage they haven't been able to get their weekly operations above four days. This is particularly noticeable in the East.

Fabricated steel prices are stronger. There is a growing tendency to pay premium prices, with deliveries lengthening. In estimating fabricated volume for the second and third quarters, notably bridges, New England shops are taking into consideration the possibility of having to pay higher prices on plain material.

Because of the uncertain supply

(*Please turn to page* 147)



Ask "the Man in the Barrel" to tell you how . . .

A Grinding Oil can *make* or *break* precision grinding jobs!

If you're using *just a coolant* or any oil that happens to be handy for those precision grinding jobs . . . it's costing you money!

A grinding oil can make or break a precision grinding job such as thread grinding, gear grinding and many types of form grinding. Grinding oils are usually classified as "hard-acting" or "soft-acting" depending on how they affect grinding wheel hardness. Grinding oil characteristics must be closely co-ordinated with wheel characteristics, speeds, feeds, and material machinability and hardness to obtain maximum performance.

When form grinding low hardness materials, where wheel form is important, a "hard-acting" oil helps to maintain proper wheel form by making the wheel act harder. As a result, greater wheel life is obtained and more accurate parts are produced.

When a high hardness material is being ground there is a tendency for the wheel to load-up and glaze. Such a condition is the cause of burnt work surfaces and heat checks, and is often encountered when grinding taps, gauges and other hardened parts. A "soft-acting" grinding oil will make the wheel act softer, opening up the wheel and exposing new abrasive grains to do the work.

Stuart's complete line of grinding oils have been chemically balanced and scientifically tested to meet the demands of various types of precision grinding operations. "The Man in the Barrel," your trained Stuart Representative, will be happy to assist you in selecting the proper grinding oil for your particular needs. Ask to have him call . . . and ask for a Stuart's Precision Grinding Oil Bulletin, too.

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Ores

Lake Superior Iron Ore

(Prices effective for the 1955 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$10.40
Old range nonbessemer	10.25
Mesabi bessemer	10.25
Mesabi nonbessemer	10.10
Open-hearth lump	11.25
High phosphorus	10.00

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hematite (spot)	nom. 18.00-20.00
Brazilian iron ore, 68-69% (spot)	24.00-26.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	*$30.00-$31.00*
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 95c-$1.05 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, 75c-80c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African	
48% 2.8:1	nom. $45.00-$50.00
48% 3:1	42.00-44.00
48% no ratio	34.00
South African Transvaal	
44% no ratio	$19.00-$20.00
48% no ratio	32.00
Domestic	
Rail nearest seller	
18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.60-$3.85
60-65%	3.85-4.00

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

Super-Duty: St. Louis, $150.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., Hawston, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

Super Duty: Hays, Sproul, Hawston, Pa., Warren, Windham, O., Athens, Tex., $145; Morrisville, Pa., Niles, O., $148; Joliet, Ill., $151; Curtner, Calif., $163.

Semisilica Brick (per 1000)

Clearfield, Pa., $139; Philadelphia, $124; Woodbridge, N. J., $122.

Insulating Fire Brick (per 1000)

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O. $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $194; Danville, Ill., $197; Philadelphia, $201

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Clearfield, Pa., $241; Danville, Ill., $244; Philadelphia, $248.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Clearfield, Pa., Philadelphia, $286.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)

Reesdale, Pa., $253.70; Johnstown, Pa. $259.20, Clearfield, Pa., $259.40; St. Louis, $259.45; Bridgeburg, Pa., $286.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nario, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk, ¼-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅝-in. grains with fines: Baltimore, $66.40.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.25-$14.00
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$25.50
Camden, N. J., ovens	25.00
Everett, Mass., ovens	
New England, deld.	*27.05
Chicago, ovens	25.75
Chicago, deld.	27.25
Terre Haute, Ind., ovens	25.50
Milwaukee, ovens	26.25
Indianapolis, ovens	25.50
Portsmouth, O., ovens	24.75
Cincinnati, deld.	27.34
Painesville, O., ovens	26.25
Cleveland, deld.	28.18
Birmingham, ovens	24.40
Cincinnati, deld.	29.33
Buffalo, ovens	25.75
Buffalo, deld.	27.00
Lone Star, Tex., ovens	19.50
Neville Island, Pa., ovens	25.00
Philadelphia, ovens	25.00
Swedeland, Pa., ovens	25.00
St. Paul, ovens	25.00
Detroit, ovens	26.25
Detroit, deld.	27.25
Pontiac, deld.	27.81
Saginaw, deld.	29.33

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00
Per ton, bulk, ovens	
Ammonium sulphate	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

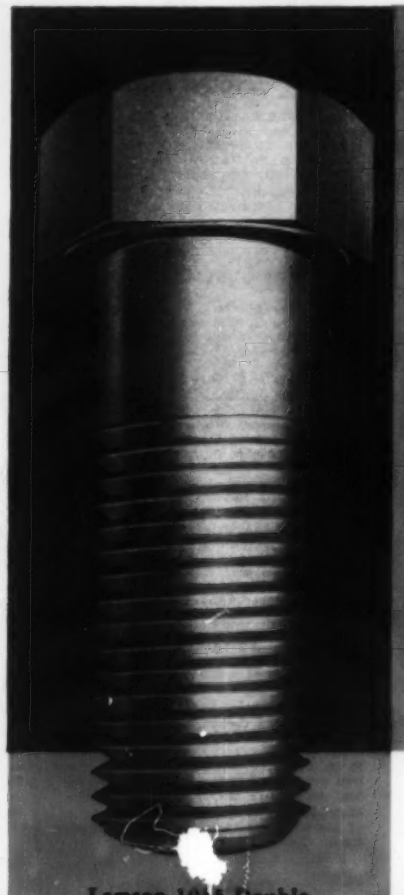
Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-$39; 70%, $35-$36; 60%, $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $25.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

Diam	Length	Per 100 lb
GRAPHITE		
Inches		
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5½	40	30.00
6	60	27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25
CARBON		
8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90



Lamson

1035 CAP SCREWS OFFER GREATER STRENGTH AT...

Less Cost!

If you are now using Full Finished Screws in your assembly operations it will pay you to consider substituting Lamson 1035 Double Heat Treated Cap Screws.

The extra relative toughness of Lamson 1035's enables you to use screws of smaller diameter, yet with equal, or greater, tensile strength.

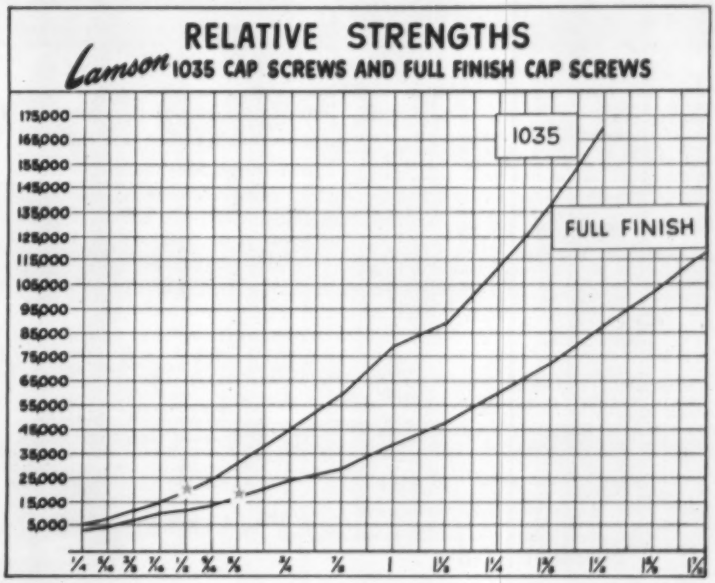
As an example of increased strength at less cost—on the chart below you will see that a ½"* diameter Lamson 1035 Cap Screw has greater tensile strength than a ⅝"* diameter Full Finished Cap Screw. This means savings in weight and size of assembly.

As for money savings—Lamson ½" x 2" 1035 Cap Screws are net priced at $5.36 per hundred as compared to $7.59 per hundred for the ⅝" x 2" Full Finished Screw. Proportionate savings can be made all along the line.

Lamson 1035 Double Heat Treated High Tensile Cap Screws have long been favorites where extra strength and durability is required.

To attain this extra strength, Lamson Cap Screws are first heat treated at about 1600° F. and then quenched. This imparts "hardness". Then the screws are "drawn", or re-heated, to between 900° F. and 1100° F. and then quenched in a special oil.

This results in a minimum tensile strength of 150,000 pounds per square inch.



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Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $90.50; 19-21% Mn, 1-3% Si, $88; 16-19% Mn, $86.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 29.95c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 21.85c per lb of contained Mn, packed, carload 22.9c, ton lot 24.5c, less ton 25.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carloads, 30c; 2000 lb to min carloads, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.2c per lb of alloy. Packed, c.l. 12.2c, ton 12.65c, less ton 13.65c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N.Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 31.75c per lb contained Cr, 0.02 max 38.50c, 0.03 max 38c, 0.06 max 36.50c, 0.1 max 36c, 0.15 max 35.75c, 0.2 max 35.50c, 0.5 max 35.25c, 1.0 max 34c, 1.5 max 33.85c, 2.0 max 33.75c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 8 M x D, bulk 27.4c per lb contained Cr. Packed c.l. 28.7c, ton 30.5c, less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carloads, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.2% min, Fe 0.2 max). Contract, cariot, packed 2" x D plate (about ⅛" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.28. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contact, carload, lump, bulk, 11.75c per lb of contained Si. Packed, c.l. 13.85c, ton lot 15.3c, less ton 16.95c. F.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lots, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07 max Ca). C.l. lump, bulk, 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lots packed 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c, per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carboriam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 21.5c per lb of alloy, carload packed 22.95c, ton lot 25.25c, less ton 26.75c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.1c per lb of briquet, c.l. packed, pallets 12.3c, bags 13.1c; 3000 lb to c.l., pallets 13.5c; 2000 lb to c.l., bags, 14.3c, less ton 15.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.7c per lb of briquet, c.l. packed, pallets, 12.9c; bags 13.7c, 3000 lb to c.l., pallets, 14.1c; 2000 lb to c.l., bags, 14.9c; less ton 15.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.75c per lb of briquet; packed, pallets, 6.95c; bags, 7.75c; 3000 lb to c.l., pallets, 8.55c; 2000 lb to c.l. bags 9.35c; less ton 10.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.9c. Packed, pallets 7.1c; bags 7.9c; 3000 lb to c.l. pallets 8.7c; 2000 to c.l. bags 9.5c; less ton 10.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carloads packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, c.l. packed ½" x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-3 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c. f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 16.50c. Packed c.l. 17.50c, 2000 lb to c.l. 18.50c, less than 2000 lb 19c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Sigio, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.46 in all sizes except powdered which is $1.57; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.25 in cans; in bags, $1.24, f.o.b. Langeloth, Pa.; $1.24, Washington, Pa.

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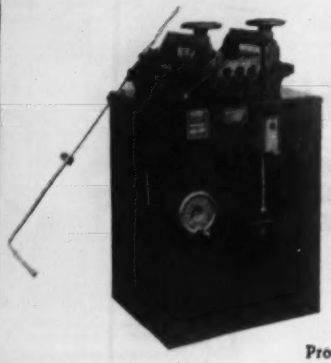

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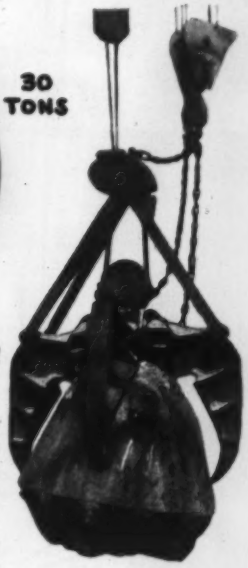

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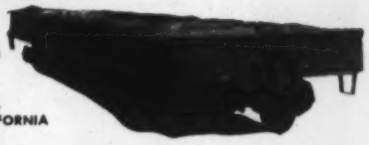

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(*Concluded from page* 140)

outlook, more shops are unwilling to enter long-term contracts.

Continued tightening in supply is expected over the coming months. Producers will enter the new year with carry-overs so hefty a considerable portion of first quarter production will have to be blanked out. Meanwhile, demand is building up. Heavy tonnage is being placed for the Connecticut highway program.

About 12,000 tons of steel will be required for a new graving dock for the New York Shipbuilding Corp., Camden, N. J. Included are more than 500,000 lineal feet of sheet steel piling and five miles of 2-to-10-in. pipe. The dock will be equipped with two 80-ton and four 40-ton traveling whirler cranes.

Steel Output Breaks Records

The nation's furnaces poured more steel in October than ever before in a single month, reports the American Iron & Steel Institute. Output totaled 10,502,000 net tons, bringing production for the first ten months of the year to 96,286,118 tons, also a new record.

The previous record for a comparable ten-month period was in 1953 (94,973,339 tons). In the first ten months of 1954, only 71,935,152 tons were produced.

October was the third month in history of more than 10 million tons of production. The other two were March, 1953, with 10,168,098 tons, and May, 1955, with 10,328,316 tons. October production this year was about 620,000 tons above the 9,882,325 tons reported for September. A year ago in October, output totaled 7,701,533 tons.

The index of production for October this year was 147.6, compared with 143.5 in the preceding month and 108.3 in October a year ago. The index for the first ten months was 138.

October production was at 98.2 per cent of the Jan. 1, 1955, capacity of 125,828,310 tons. Output in the first ten months was at 91.9 per cent of capacity. In 1954, when capacity was rated at 124.3 million tons, production during October was at 72.9 per cent of capacity, the first ten months, 69.5 per cent.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

7350 tons, bridge superstructure, Housatonic river bridge, Connecticut turnpike, Stratford-Milford, Conn., project 313-02, to American Bridge Division, U. S. Steel Corp., Pittsburgh, direct; 34-span structure, 1475 tons low alloy steel included girder spans; also 875 tons, reinforcing bars.

3425 tons, bridge superstructure, Saugatuck river, Westport, Conn., project 307-04, direct, to Phoenix Bridge Co., Phoenixville, Pa.; ten riveted plate girder spans with reinforced concrete deck, 425 tons, bars.

2900 tons, 11 grade separation structures and bridge over New Haven Railroad, Connecticut turnpike, Darien-Norwalk-Westport, Conn., projects 306-03 and 307-01, to Harris Structural Steel Co., New York; Savin Construction Co., Hartford, Conn., general contractor; contract also includes substructure, Saugatuck river bridge, Westport, Conn., additional steel, 1525 tons, reinforcing bars; 295 tons, steel piles, and 220 tons, steel sheet piling.

2325 tons, six overpassing and two underpassing structures, Connecticut turnpike, Milford, Conn., project 314-03, to Harris Structural Steel Co., New York; Savin Construction Co., Hartford, general contractor; contract also includes 800 tons, reinforcing bars, and 590 tons, steel piles.

1400 tons, municipal incinerator, Greenpoint, Brooklyn, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.

1250 tons, state bridges, Southeast expressway, Boston-Milton, Mass., to American Bridge Division, U. S. Steel Corp., Pittsburgh, through the Savin Construction Co., Hartford, Conn., general contractor.

600 tons, five beam bridges, Spaulding turnpike, Dover, N. H., to American Bridge Division, U. S. Steel Corp., Pittsburgh, through Landers & Griffin Inc., Portsmouth, N. H., general contractor.

300 tons, senior high school, Willsboro, Pa., to the Anthracite Bridge Co., Scranton, Pa.

225 tons, two-span girder bridge, Connecticut turnpike, East Avenue, Norwalk, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Mariani Construction Co., New Haven, general contractor.

205 tons, two-span girder bridge, Wilbur Cross highway, Tolland, Conn., to Phoenix Bridge Co., Phoenixville, Pa.; D. Arrigoni Co., Middletown, Conn., general contractor.

130 tons, Du Pont project, Seford, Del., to Bethlehem Fabricators, Bethlehem, Pa.

STRUCTURAL STEEL PENDING

4000 tons, buildings 40 and 41, Creedmoor State Hospital, Long Island, N. Y., bids closed by the New York State Department of Public Works, Nov. 17.

3500 tons, 49 intake gates, Barnhart Island power plant and eight gates, Massena plant; bids Nov. 30, Power Authority, State of New York, New York.

2000 tons, transformation of riding academy into an academic hall, West Point Military Academy, West Point, N. Y.; plans by Army Engineers, New York District, New York, with bids to be in early next month.

763 tons, state bridge work, York county, Pa.; bids Dec. 2. Also required, are 550 tons of reinforcing bars.

	OPEN HEARTH			BESSEMER			ELECTRIC			TOTAL			Calculated weekly production (Net tons)	Number of weeks in month
Period	Net tons	Per cent of capacity	‡Index	Net tons	Per cent of capacity	‡Index	Net tons	Per cent of capacity	‡Index	Net tons	Per cent of capacity	‡Index		
1955														
January	8,054,345	86.0	125.7	199,229	49.0	56.7	584,162	63.6	163.6	8,837,736	82.7	124.2	1,994,974	4.43
February	7,734,884	91.5	133.7	197,091	53.7	62.1	564,959	68.1	175.1	8,496,934	88.0	132.2	2,124,233	4.00
March	9,060,026	96.7	141.4	256,493	62.8	72.7	666,235	72.6	186.5	9,981,754	93.4	140.3	2,253,281	4.43
1st Quarter	24,849,255	91.4	133.6	651,813	55.2	63.9	1,815,356	68.1	175.1	27,316,424	88.0	132.3	2,124,139	12.86
April	8,858,549	97.7	142.9	275,069	69.8	80.9	681,477	76.6	197.2	9,815,095	94.8	142.6	2,287,901	4.29
May	9,307,291	99.4	145.3	305,347	75.1	86.9	715,678	77.9	200.4	10,328,316	96.6	145.2	2,331,448	4.43
June	*8,764,430	96.6	141.4	283,544	72.0	83.4	*698,493	78.6	202.1	9,746,467	94.1	141.6	2,271,904	4.29
2nd Quarter	*26,930,270	97.9	143.2	863,960	72.3	83.8	*2,095,648	77.7	199.9	29,889,878	95.2	143.1	2,297,454	13.01
1st 6 Months	*51,779,525	94.7	138.5	1,515,773	63.8	73.9	*3,911,004	72.9	187.5	57,206,302	91.6	137.7	2,211,299	25.87
July	8,232,535	88.1	128.5	268,348	66.1	76.4	600,063	65.5	168.0	9,100,946	85.3	127.9	2,059,038	4.42
August	8,600,612	91.8	134.3	298,972	73.5	85.1	694,000	75.7	194.6	9,594,545	89.7	134.9	2,165,812	4.43
*September	8,829,266	97.6	142.4	307,171	78.2	90.3	745,888	84.1	215.8	9,882,325	95.7	143.5	2,308,954	4.28
*3rd Quarter	25,662,413	92.4	135.0	874,491	72.6	83.9	2,040,912	75.0	192.5	28,577,816	90.2	135.4	2,176,528	13.13
*9 Months	77,441,938	93.9	137.3	2,390,264	66.8	77.2	5,951,916	73.6	189.2	85,784,118	91.1	136.9	2,199,593	39.00
†October	9,374,000	100.1	146.3	330,000	81.1	93.9	798,000	86.9	223.4	10,502,000	98.2	147.6	2,371,000	4.43
1954														
January	7,256,526	78.3	113.3	260,453	64.0	74.1	434,507	48.9	121.7	7,951,486	75.3	111.8	1,794,918	4.43
February	6,523,213	77.9	112.8	174,253	47.4	54.9	385,771	48.1	119.6	7,083,237	74.3	110.2	1,770,809	4.00
March	6,649,667	71.7	103.8	207,726	51.1	59.1	432,207	48.7	121.0	7,289,600	69.0	102.5	1,645,508	4.43
1st Quarter	20,429,406	75.9	109.9	642,432	54.4	63.0	1,252,485	48.6	120.8	22,324,323	72.8	108.1	1,735,950	12.86
April	6,365,326	70.9	102.7	162,657	41.3	47.8	442,954	51.5	128.2	6,970,937	68.1	101.3	1,624,927	4.29
May	6,817,951	73.6	106.4	195,063	48.7	56.4	456,724	51.4	127.9	7,472,738	70.7	105.0	1,686,848	4.43
June	6,702,006	74.7	108.1	207,666	52.7	61.1	453,962	52.8	131.3	7,363,634	72.0	107.0	1,716,465	4.29
2nd Quarter	19,885,283	73.1	105.8	565,386	47.6	55.1	1,353,640	51.9	129.1	21,807,309	70.3	104.4	1,676,196	13.01
1st Half	40,314,689	74.5	107.8	1,210,818	51.0	59.0	2,606,125	50.3	125.0	44,131,632	71.5	106.2	1,705,900	25.87
July	6,040,120	65.3	94.3	205,313	50.6	58.4	382,164	43.1	107.0	6,627,597	62.9	93.2	1,499,456	4.42
August	6,021,496	65.0	94.0	217,837	53.6	62.0	427,574	48.2	119.7	6,666,907	63.1	93.7	1,504,945	4.43
September	6,140,266	68.6	99.1	214,065	54.5	63.0	453,152	52.8	131.1	6,807,483	66.7	98.9	1,590,533	4.28
3rd Quarter	25,661,147	92.4	135.0	874,320	72.5	83.8	1,262,890	48.0	119.1	20,101,987	64.2	95.2	1,530,997	13.13
9 Months	77,440,672	93.9	137.3	2,390,093	66.8	77.2	3,869,015	49.5	123.0	64,233,619	69.1	102.5	1,647,016	39.00
October	6,973,568	75.2	108.9	237,754	58.5	67.7	490,211	55.2	137.3	7,701,533	72.9	108.3	1,738,495	4.43
November	7,307,151	81.4	117.9	231,191	58.7	68.0	551,085	64.1	159.4	8,089,427	79.1	117.5	1,825,647	4.29
December	7,530,204	81.4	117.6	231,126	57.0	65.8	525,743	59.4	147.2	8,287,073	78.6	116.5	1,874,903	4.42
4th Quarter	21,810,923	79.3	114.7	700,071	58.0	67.1	1,567,039	59.5	147.8	24,078,033	76.8	114.0	1,832,423	13.14
2nd Half	40,012,805	72.8	105.2	1,337,286	55.4	64.1	2,529,929	53.8	133.5	44,180,020	70.5	104.6	1,681,767	26.27
Total	80,327,494	73.6	106.5	2,548,104	53.2	61.6	5,436,054	52.0	129.3	88,311,652	71.0	105.4	1,693,741	52.14

Note—The percentages of capacity operated are calculated on weekly capacities in 1955 of 2,114,196 net tons open hearth, 91,810 net tons bessemer and 207,272 net tons electric ingots and steel for castings, total 2,413,278 net tons; based on annual capacities as of Jan. 1, 1955, as follows: Open hearth 110,234,160 net tons, bessemer 4,787,000 net tons, electric 10,807,150 net tons, total 125,828,310 net tons.

Note—The percentages of capacity operated are calculated on weekly capacities in 1954 of 2,092,342 net tons open hearth, 91,810 net tons bessemer and 200,397 net tons electric ingots and steel for castings, total 2,384,549 net tons; based on annual capacities as of Jan. 1, 1954, as follows: Open hearth 109,094,730 net tons, bessemer 4,787,000 net tons, electric 10,448,680 net tons, total 124,330,410 net tons.

*Revised. †Preliminary figures, subject to revision. ‡Index of production based on average weekly production of the three years 1947-1948-1949.

335 tons, railroad, replacement project, Gorge dam improvement, King county, Washington; bids to U. S. Engineer, Seattle, Dec. 6.

170 tons, girder bridge, Greenfield, Mass.; bids in.

125 tons, state highway bridge, Woolwich, Me.; bids Nov. 23, Augusta, Me.

115 tons, state highway bridge, Walpole, Mass.; also 100 tons, steel piles.

100 tons plus, including reinforcing bars, gates, etc., East Low canal, Columbia Basin project; bids to the Bureau of Reclamation, Ephrata, Wash., Dec. 15.

Unstated, bulk supply warehouse, Elelson Air Field, Alaska; Baker & Ford, Bellingham, Wash., low at $674,707 to U. S. Engineer.

REINFORCING BARS . . .

REINFORCING BARS PLACED

185 tons, Noxon Rapids power project, Montana, to Bethlehem Pacific Coast Steel Corp., Seattle; Peter Kiewit & Sons Co., general contractor.

187 tons, Washington state Satus highway bridge, to Bethlehem Pacific Coast Steel Corp., Seattle; Snook Bros., Eugene, Oreg., general contractor.

120 tons, guided missile project, Redmond, Wash., to James D. English Steel Co., Tacoma, Wash.; Kuney-Johnson Co., Seattle, general contractor.

107 tons, Army storage project, Deep Creek, Wash., to Soule Steel Co., Portland, Oreg.; Max J. Kuney Co., Spokane, Wash., low at $654,000 to U. S. Engineer.

100 tons, department store addition, Spokane, Wash., to Northwest Steel Rolling Mills Inc., Seattle.

REINFORCING BARS PENDING

23,000 tons, Priest Rapids dam, Columbia river, Wash., $180 million project; bids will be invited in January by Grand County P.U.D., Ephrata, Wash., Glenn A. Smothers, manager.

136 tons, including 90 tons in Snohomish county, Washington state projects; bids to Olympia, Wash., Nov. 29.

123 tons, Washington state T-beam bridge, Adams county; bids to Olympia, Wash., Nov. 29.

109 tons, flume replacement, Irrigation District, Selah, Wash.; bids Nov. 21.

Unstated, Oregon road projects, general contracts awarded: Multnomah county: 300-ft expressway structure, Lord Bros., Portland, Oreg., low at $294,444; undercrossing to Gibbons & Reed Co., Portland, Oreg., $174,170; Josephine county, 418-ft reinforced bridge, Ausland Construction Co., Grants Pass, Oreg., $52,580; Wheeler county, 343-ft span to A. H. Saxton & Son, Corvallis, $131,515; Douglas county, 787-ft bridge and 163-ft pass, Valley Construction Co., Portland, Oreg., $427,220; Coos county, 370-ft bridge to Sig Anderson, North Bend, $139,839; Union Ave. expressway including grading, Portland Oreg., to Gibbons & Reed, Spokane, Wash., $1,097,000.

PLATES . . .

PLATES PLACED

300 tons, 1-million-gal tank, Bellevue, Wash., to Chicago Bridge & Iron Co., Seattle.

120 tons, water storage tank, Quincy, Wash., to American Pipe & Construction Co., Portland, Oreg.

100 tons, sheet piling for inventory, Hansen & Parr, Spokane, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle.

PLATES PENDING

1600 tons, 24 vertical, bolted, knocked-down tanks, 3000-bbl capacity each; bids Nov. 28, Navy, Bureau of Yards and Docks, Port Hueneme, Calif.

RAILS, CARS . . .

LOCOMOTIVES PENDING

Missouri-Kansas-Texas, 550 fifty-ton boxcars and 25 fifty-ton flatcars.

Western Pacific, 410 miscellaneous freight cars. List comprises 275 boxcars, 100 seventy-ton hopper ballast cars, 10 seventy-ton covered hopper cars and 25 fifty-ton flatcars.

RAILROAD CARS PLACED

Louisville & Nashville, 1000 freight cars. List comprises 500 boxcars, 200 gondolas, pulpwood cars and 100 flatcars. ACF Industries, New York, Pullman-Standard Car Mfg. Co., Chicago, and Greenville Steel Car Co., Greenville, Pa., will build the cars for delivery late next year.

Rutland, 100 fifty-ton boxcars and 15 covered hopper cars to Pullman-Standard Car Mfg. Co., Chicago.

Northern Pacific, ten lightweight baggage cars and five parlor-bar-lounge cars to the Pullman-Standard Car Mfg. Co., Chicago.

Chicago, Rock Island & Pacific, 25 baggage cars, to ACF Industries Inc., New York.

Erie Mining Co., six 22,000-gal oil tank cars, to Shippers Carline Corp., New York.

Chesapeake & Ohio, 1000 seventy-ton gondola cars, to ACF Industries Inc., New York. List comprises 750 high-side fixed-end cars and 250 low-side, drop-end cars. Delivery is scheduled to begin in third quarter next year.

Reading, 500 seventy-ton gondolas and 500 seventy-ton hoppers, to Bethlehem Steel Co., Bethlehem, Pa.

Northern Pacific, 1000 fifty-ton boxcars and 200 ore cars, to its own shops.

RAILS PLACED

Louisville & Nashville, 35,000 tons of 132-lb. rail, to the Tennessee Coal & Iron Division U. S. Steel Corp., Pittsburgh.

RAILS PENDING

Pennsylvania, unstated tonnage; bids Nov. 29.

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Pacific Coast Representative: *A. C. Berbringer, Inc., 334 N. San Pedro St., Los. Angeles, California.* Canada: *F. F. Barber Machinery Co., Toronto, Canada.*

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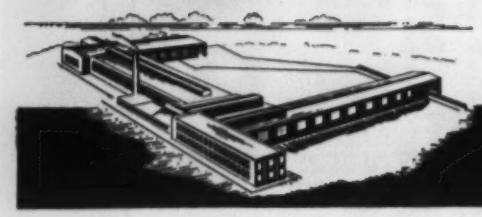

KEYSTONE DRAWN STEEL CO.
SPRING CITY PENNSYLVANIA

Scrap . . .

Scrap Prices, Page 150

Pittsburgh—Any mill entering the market for No. 1 heavy melting scrap would have to pay $46 a ton, it is said. Only two sales of No. 1 heavy have been reported the last two weeks, and one was to a mill on the fringe of this district. Heavy demand from areas west, north and east of Pittsburgh bolsters the local market. The most lively aspect of scrap demand is in railroad sales. Prices of rails advanced $1 a ton.

Buffalo—New business is lacking, but strength dominates the local scrap market, with prices unchanged.

Philadelphia—Scrap prices are featured by two advances: Couplers, springs and wheels went up to $53, delivered; malleable rose to $50.50. The market is generally strong.

No. 1 cupola cast has advanced sharply to $46, delivered, on buying by U. S. Steel for its Fairless Works.

New York—Brokers have increased their buying prices on low phos structural and plate to $42.50-$43.50. Prices otherwise are unchanged.

Cincinnati—The situation in the scrap market here is mixed. A limited tonnage was purchased by the local mill, but the price situation is not clear. Except for a 50-cent increase in No. 2 heavy melting and No. 2 bundles, prices are steady.

Chicago—Firmness continues in the scrap market here, but new buying has not occurred in sufficient volume to provide a price test. It is material of dealer origin that arouses little consumer interest. Currently, there is a $3 spread between No. 1 industrial and No. 1 dealer heavy melting, with the former pegged at $46 and the latter at $43. There are reports that dealers have been paying $43.

Boston — Except for a slightly firmer tone in No. 2 heavy melting steel for delivery to eastern Pennsylvania, steel scrap prices are unchanged. Cast iron grades are retaining their recent strength on district delivery tonnage. Brokers are paying up to $40, shipping point, for No. 1 short steel. No. 2 bundles, delivered to dock for export, are $1 higher than domestic shipment tonnage.

Birmingham—With supplies tightening in all grades, some scrap dealers are holding material for inventory in anticipation of higher prices. Prices are unchanged generally, but reports persist that higher levels are being paid for special lots of steelmaking materials. Connors Steel Division, the H. K. Porter Company Inc., is buying No. 2 bundles, with electric furnace bundles scarce.

Los Angeles—Scrap dealers report market softness following the recent firming up of prices. Some mills purchased more than their immediate needs when rumors of price increases began circulating.

San Francisco—Steel scrap prices are steady at the recently established higher levels. Deliveries may be slowed by heavy rains.

Cleveland—Prices throughout the list are steady, despite the absence of representative buying. Heavy tonnage is moving to consumers against old orders. There is considerable competition for the quality grades of material.

St. Louis—Scrap prices are firming. Rail offerings are dwindling. Shipments from country points are fair.

Seattle — While $44 and $40 are quoted on No. 1 and No. 2 heavy melting steel, respectively, scrap consumers expect a moderate dip in prices. They assert that the market is too high. High prices have attracted heavy shipments to tidewater.

Japan is still interested in tonnage, but exporters wonder how long that country can afford to pay $60 a ton.

Rails, Cars . . .

Track Material Prices, Page 135

The Louisville & Nashville Railroad has ordered 35,000 net tons of 132-lb steel rails from the Tennessee Coal & Iron Division, U. S. Steel Corp. They will cost $5,600,000. The road also ordered an unspecified number of freight cars from the Bessemer, Ala., plant of Pullman-Standard Car Mfg. Co. at a cost of $3,300,000.

Iron Ore . . .

Iron Ore Prices, Page 142

Shipments of Lake Superior iron ore totaled 2,301,801 gross tons in the week ended Nov. 14, reports the Lake Superior Iron Ore Association. This compares with 909,659 tons moved in the like week of 1954.

Up to Nov. 14, cumulative shipments in the 1955 navigation season were 84,079,732 tons. On the same date last year, shipments amounted to only 59,790,113 tons.

Pig Iron . . .

Pig Iron Prices, Page 137

Some pig iron sellers believe November business will establish a new high for the year, despite fewer working days. The gain in bookings is due in part to the accumulation of inventories by foundries in anticipation of winter and sustained high level consumption

New England shops supplying castings for machine tools are more ac-

(*Please turn to page* 152)

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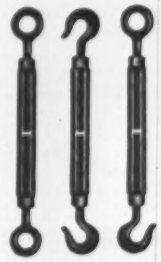

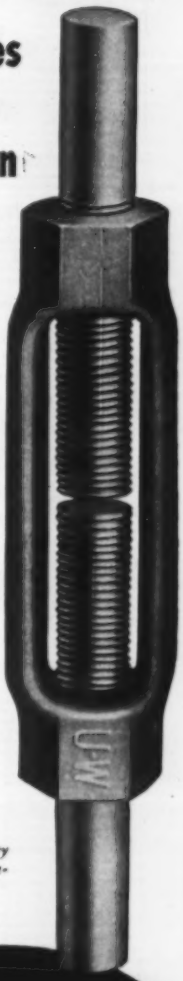

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Nov. 16	$45.67
Nov. 9	45.33
Oct. Avg.	45.17
Nov. 1954	33.33
Nov. 1950	41.33

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer's plant)

No. 1 heavy melting	*45.00-46.00*
No. 2 heavy melting	40.00-41.00
No. 1 bundles	*45.00-46.00*
No. 2 bundles	36.00-37.00
No. 1 busheling	*45.00-46.00*
Machine shop turnings	29.00-30.00
Mixed borings, turnings	29.00-30.00
Short shovel turnings	33.00-34.00
Cast iron borings	33.00-34.00
Cut structurals, 3 ft lengths	49.00-50.00
Heavy turnings	42.00-43.00
Punchings & plate scrap	49.00-50.00
Electric furnace bundles	48.00-49.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Charging box cast	39.00-40.00
Heavy breakable cast	39.00-40.00
Unstripped motor blocks	29.00-30.00
No. 1 machinery cast	50.00-51.00

Railroad Scrap

No. 1 R.R. heavy melt.	49.00-50.00
Rails, 2 ft and under	*59.00-60.00*
Rails, 18 in. and under	*60.00-61.00*
Rails, random lengths	*56.00-57.00*
Railroad specialties	54.00-55.00

Stainless Steel Scrap

18-8 bundles & solids	270.00-285.00
18-8 turnings	130.00-140.00
430 bundles & solids	100.00-110.00
430 turnings	60.00-65.00

CLEVELAND

(Delivered consumer's plant)

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	45.00-46.00
No. 2 bundles	35.00-36.00
No. 1 busheling	45.00-46.00
Machine shop turnings	23.00-24.00
Mixed borings, turnings	27.50-28.50
Short shovel turnings	27.50-28.50
Cast iron borings	27.50-28.50
Low phos.	45.00-46.00
Cut structural plates 2 ft and under	50.00-51.00
Alloy free, short shovel turnings	31.00-32.00
Electric furnace bundles	45.50-46.50

Cast Iron Grades

No. 1 cupola	47.00-48.00
Charging box cast	40.00-41.00
Stove plate	46.00-47.00
Heavy breakable cast	37.00-38.00
Unstripped motor blocks	29.00-30.00
Brake shoes	35.00-36.00
Clean auto cast	48.00-49.00
Burnt cast	37.00-38.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
R.R. malleable	53.00-54.00
Rails, 2 ft and under	62.00-63.00
Rails, 18 in. and under	63.00-64.00
Rails, random lengths	58.00-59.00
Cast steel	48.00-49.00
Railroad specialties	54.00-55.00
Uncut tires	49.00-50.00
Angles, splice bars	54.50-55.50
Rails, rerolling	63.00-64.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	290.00-300.00
18-8 turnings	130.00-140.00
430 clips, bundles, solids	90.00-100.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer's plant)

No. 1 heavy melting	47.50-48.50
No. 2 heavy melting	35.00-36.00
No. 1 bundles	47.50-48.50
No. 2 bundles	32.00-33.00
No. 1 busheling	47.50-48.50
Machine shop turnings	24.00-25.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Low phos.	47.50-48.50
Electric furnace bundles	47.50-48.50

Railroad Scrap

No. 1 R.R. heavy melt.	48.00-49.00

CHICAGO

No. 1 heavy melting	43.00-46.00
No. 2 heavy melting	34.00-35.00
No. 1 factory bundles	46.00-47.00
No. 1 dealer bundles	43.00-44.00
No. 2 bundles	33.00-34.00
No. 1 busheling	43.00-46.00
Machine shop turnings	27.00-28.00
Mixed borings, turnings	29.00-30.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Cut structurals, 3 ft	47.00-48.00
Punchings & plate scrap	48.00-49.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Stove plate	38.00-39.00
Unstripped motor blocks	34.00-35.00
Clean auto cast	50.00-51.00
Drop broken machinery	50.00-51.00

Railroad Scrap

No. 1 R.R. heavy melt.	48.00-49.00
R.R. malleable	56.00-57.00
Rails, 2 ft and under	60.00-61.00
Rails, 18 in. and under	61.00-62.00
Angles, splice bars	57.00-58.00
Rails, rerolling	*66.00-67.00*

Stainless Steel Scrap

18-8 bundles & solids	*320.00-335.00*
18-8 turnings	*225.00-235.00*
430 bundles & solids	100.00-105.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	39.50
No. 2 heavy melting	30.00
No. 1 bundles	39.50
No. 2 bundles	28.00
No. 1 busheling	39.50
Machine shop turnings	22.00
Mixed borings, turnings	22.00
Short shovel turnings	24.00
Punchings & plate scrap	48.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	33.00
Stove plate	32.00
Heavy breakable	32.00
Unstripped motor blocks	22.00
Clean auto cast	44.00
Malleable	35.00

BIRMINGHAM

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	35.00-36.00
No. 1 bundles	38.00-39.00
No. 2 bundles	28.00-29.00
No. 1 busheling	38.00-39.00
Cast iron borings	17.00-18.00
Short shovel turnings	28.00-29.00
Machine shop turnings	27.00-28.00
Electric furnace bundles	43.00-44.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.50-48.00
Stove plate	44.50-45.50
Bar crops and plate	47.00-48.00
Structural plate, 2 ft	46.00-47.00
Unstripped motor blocks	36.00-37.00
Charging box cast	30.00-31.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00-44.00
Rails, 18-in. and under	58.50-59.50
Rails, rerolling	58.00-59.00
Rails, random lengths	53.00-54.00
Angles, splice bars	55.00-56.00

PHILADELPHIA

(Delivered consumer's plant)

No. 1 heavy melting	47.00
No. 2 heavy melting	41.00
No. 1 bundles	47.00
No. 2 bundles	37.00-38.00
No. 1 busheling	47.00
Electric furnace bundles	48.50
Machine shop turnings	29.50
Mixed borings, turnings	29.50
Short shovel turnings	32.00
Structurals & plate	49.00-51.00
Heavy turnings	43.00
Couplers, springs, wheels	*53.00*
Rail crops, 2 ft & under	59.00-60.00

Cast Iron Grades

No. 1 cupola	*46.00*
Malleable	*60.50*
Heavy breakable cast	46.50
Drop broken machinery	48.00-49.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	37.00-38.00
No. 1 bundles	41.00-42.00
No. 2 bundles	32.00-33.00
Machine shop turnings	20.00-21.00
Mixed borings, turnings	21.00-22.00
Short shovel turnings	22.00-23.00
Low phos. (structural & plate)	*42.50-43.50*

Cast Iron Grades

No. 1 cupola	37.00-38.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	38.00-39.00

Stainless Steel

18-8 sheets, clips, solids	290.00-300.00
18-8 borings, turnings	150.00-160.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	37.50-40.00
No. 2 heavy melting	*33.00-35.50*
No. 1 bundles	37.50-39.00
No. 2 bundles	28.00-28.50
Machine shop turnings	21.00-21.50
Mixed borings, turnings	23.00-23.50
Short shovel turnings	24.00-24.50
No. 1 cast	36.00-36.50
Mixed cupola cast	34.00-34.50
No. 1 machinery cast	39.00-39.50

BUFFALO

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	37.00-38.00
No. 1 bundles	43.00-44.00
No. 2 bundles	32.00-33.00
No. 1 busheling	43.00-44.00
Mixed borings, turnings	29.00-30.00
Machine shop turnings	27.00-28.00
Short shovel turnings	30.00-31.00
Cast iron borings	30.00-31.00
Low phos.	47.00-48.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	40.00-41.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	47.00-48.00
Rails, 2 ft and under	51.00-52.00
Railroad specialties	48.00-49.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	*35.00-36.00*
No. 1 bundles	41.00-42.00
No. 2 bundles	*32.00-33.00*
No. 1 busheling	41.00-42.00
Machine shop turnings	25.50-26.50
Mixed borings turnings	24.75-25.75
Short shovel turnings	28.00-29.00
Cast iron borings	24.75-25.75
Low phos., 18 in.	50.00-51.00

Cast Iron Grades

No. 1 cupola	43.50-44.50
Heavy breakable cast	41.00-42.00
Charging box cast	41.00-42.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
Rails, 18 in. and under	60.00-61.00
Rails, random lengths	53.00-54.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	38.50
No. 2 heavy melting	36.00
No. 1 bundles	39.50
No. 2 bundles	31.50
Machine shop turnings	28.00
Short shovel turnings	28.00

Cast Iron Grades

No. 1 cupola	46.50
Charging box cast	39.00
Heavy breakable cast	37.00
Unstripped motor blocks	37.00
Brake shoes	*38.00*
Clean auto cast	47.00
Stove plate	*40.00*

Railroad Scrap

No. 1 R.R. heavy melt.	48.00
Rails, 18 in. and under	*60.00*
Rails, random lengths	56.00
Rails, rerolling	64.00
Angles, splice bars	55.00

SEATTLE

(Delivered consumer's plant)

No. 1 heavy melting	44.00
No. 2 heavy melting	40.00
No. 1 bundles	39.50
No. 2 bundles	34.00
No. 3 bundles	19.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	15.00-16.00
Electric furnace, No. 1	50.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	43.00
Heavy breakable cast	38.00
No. 1 wheels	35.00
Unstripped motor blocks	29.00
Clean motor blocks	40.00
Stove plate (f.o.b. plant)	30.00
Brake shoes	35.00

Railroad Scrap (Delivered consumer's plant)

Rails, random lengths	33.00

LOS ANGELES

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	39.00
No. 2 bundles	35.00
Machine shop turnings	12.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	43.00-45.00

SAN FRANCISCO

No. 1 heavy melting	39.00
No. 2 heavy melting	37.00
No. 1 bundles	39.00
No. 2 bundles	33.00
No. 1 busheling	39.00
Machine shop turnings	18.00
Mixed borings, turnings	18.00
Short shovel turnings	20.00
Cast iron borings	18.00
Cut structurals	41.00
Heavy turnings	20.00
Punchings & plate scrap	39.00

Cast Iron Grades

No. 1 cupola	47.00-48.00
Charging box cast	35.00
Stove plate	39.00
Heavy breakable cast	36.00
Unstripped motor blocks	32.00
Brake shoes	35.00
Clean auto cast	45.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

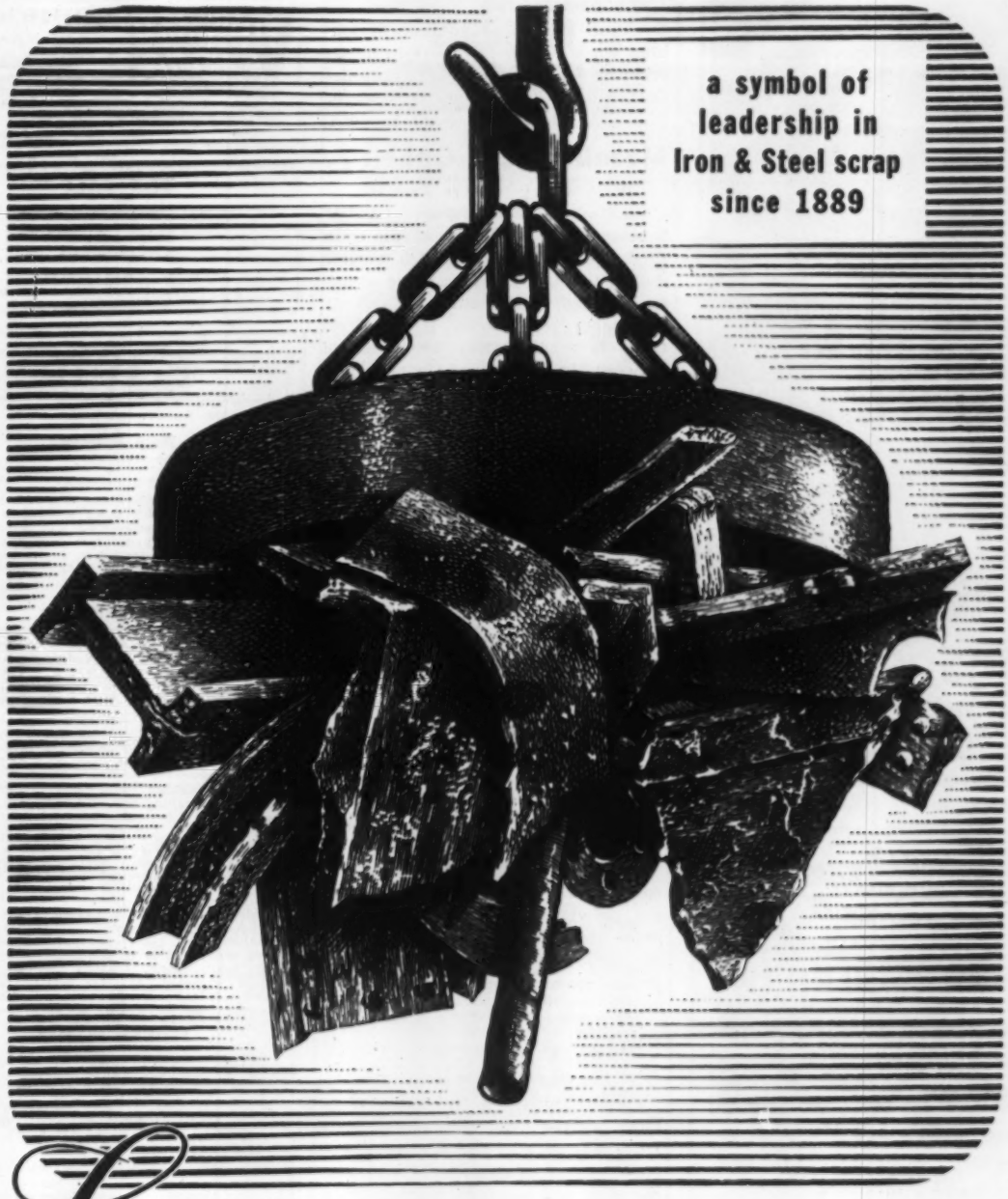
(Delivered prices)

No. 1 heavy melting	38.50
No. 2 heavy melting	35.50
No. 1 bundles	38.50
No. 2 bundles	32.50
Mixed steel scrap	32.50
Mixed borings, turnings	17.00
Rails, remelting	47.50
Busheling, new factory: Prepared	36.50
Unprepared	32.50
Short steel turnings	21.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.



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SAMSON SHOT
ANGULAR GRIT

PITTSBURGH CRUSHED STEEL CO., PITTSBURGH, PA.
STEEL SHOT & GRIT CO., BOSTON, MASSACHUSETTS

(*Concluded from page* 149)

tive and show less interest in jobbing work. They have a substantial order backlog. Shipments in that district will be 20 to 25 per cent larger this year than they were in 1954.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 142

Shortage of blast furnace coke is threatening curtailment of pig iron production in the Pittsburgh district during this quarter. In a move to improve supply, old beehive coke ovens are being reactivated. U. S. Steel Corp. is rehabilitating 500 beehives between Uniontown and Connellsville, Pa.

Steel Bars . . .

Bar Prices, Page 132

Producers of hot carbon bars could be booked up solidly, some of them through the second quarter, if they wanted to. Pressure for tonnage continues unabated with most sellers accepting new business only on a monthly basis.

In opening books for the first quarter, mills allowed for at least four weeks of overflow business from the current quarter. In some cases, they are cutting back some tonnage originally scheduled for delivery this quarter.

Requirements are highly diversified, but new business is especially heavy on automotive account.

The mills are more nearly current with demand in hot-rolled alloy bars, but deliveries in this category are becoming somewhat more extended, especially on the small sizes. Cold-drawn carbon and alloy bar shipments are reported falling behind.

Plates . . .

Plate Prices, Page 132

Despite measures to make them more current on shipments, plate mills will go into the new year well behind on commitments. Carry-over tonnage will average at least one month of production.

Mills are not booked farther ahead than the first quarter, except for government-rated work. Reason: They are refusing business for shipment beyond that period.

The heavy wave of plate buying started late last year in the Far West, sparked by large pipeline requirements. Since then, it has been gaining momentum steadily. Last summer railroad car demand revived after being dormant for months. So badly were the plate mills oversold at that time, they could accept little car business for shipment this year.

This will be on top of continued large requirements for heavy equip-

THREADED Rods

10 to 12 ft. lengths
ALL METALS
Also Screw Machine Products to Order
EASTERN
Machine Screw Corp.
New Haven, Conn.
Makers of H & G Die Heads

FOR SALE

10,800 New Machine Bolts
⅜" x 3½" with Nuts
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CLASSIFIED

Help Wanted

METALLURGIST

Steel Foundry in East desires services of graduate metallurgist with some experience in acid and basic melting procedures and sand control. Please give full particulars regarding background and salary desired in first letter. Reply Box 334, STEEL Penton Bldg., Cleveland 13, Ohio.

PLANT ENGINEER

With Electrical background for malleable iron foundry in New England. Must have had experience in supervising foundry plant maintenance. Full details will be given in personal interview. Write, giving all pertinent information to Box 335, STEEL, Penton Building, Cleveland 13, Ohio.

We desire to set up our production of small steel castings on a piece-work basis instead of hourly rates. We need the services of someone who is thoroughly familiar with such an operation, capable of installing this system in our foundry. Salary open. All replies confidential. Address: P. O. Box 13294, Houston, Texas.

Employment Service

SALARIED POSITIONS $5,000 to $35,000. We offer the original personal employment service (established 45 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered: present position protected. Ask for particulars. R. W. BIXBY, INC., 665 Brisbane Bldg., Buffalo 3, N.Y.

Positions Wanted

ABLE, ALERT, AGGRESSIVE EXECUTIVE desires change—20 years' experience—Industrial Relations—Production and Engineering. Integrated Plants. Resume Available. Reply Box 341, STEEL, Penton Bldg., Cleveland 13, Ohio.

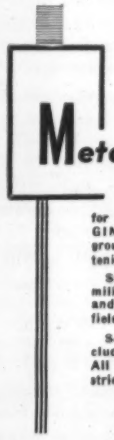
STEEL MILL SUPERINTENDENT—Combination rod and bar mill. Now actively employed in same capacity. Age 41. Twenty-two years practical experience in steel mills. Nine years as a roller. Reply Box 342, STEEL, Penton Bldg., Cleveland 13, Ohio.

ERECTION SUPERINTENDENT

Six years' experience estimating, supervising erection of mill buildings, schools, bridges and apartment houses using cranes or derricks. Will relocate. Reply Box 343, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED RATES

All classifications other than "Positions Wanted," set solid, 50 words or less $15.00, each additional word .30; all capitals, 50 words or less $19.20, each additional word .38; all capitals leaded, 50 words or less $23.40, each additional word .47. "Positions Wanted" set solid, 25 words or less $3.60, each additional word .14; all capitals, 25 words or less $4.50, each additional word .18; all capitals leaded, 25 words or less $5.40, each additional word .22. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.



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Outstanding opportunity for METALLURGICAL ENGINEER with strong background in stainless and austenitic steels.

Should be thoroughly familiar with alloying techniques and most recent trends in this field.

Send complete resume, including salary requirements. All information will be held strictly confidential.

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Recent Graduate—B.S., Met.E., Ch.E., or equivalent.

Process control of steel mill operations with particular emphasis on Open Hearth and Rolling Mill practices. Ideally located for climate and recreational facilities. Plant seven miles from Provo, forty miles from Salt Lake City. Advancement opportunities and excellent group insurance program.

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United States Steel Corporation
P. O. Box 510 **Provo, Utah**
ATTENTION: Personnel Division

ENGINEERS WANTED

MECHANICAL ENGINEERS, DESIGNERS, CHECKERS AND DRAFTSMAN, WHO ARE QUALIFIED PERSONNEL WITH EXPERIENCE IN HEAVY EQUIPMENT ARE REQUIRED FOR WORK ON SEVERAL PROJECTS. THE EQUIPMENT BEING PROCESSED COVERS ROLLING MILLS, STEEL MILL AUXILIARY EQUIPMENT, HYDRAULIC PRESSES, MATERIAL HANDLING EQUIPMENT AND SPECIAL MACHINERY. REPLY BOX 336 STEEL, PENTON BUILDING, CLEVELAND 13, OHIO.

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1—18" or 20" Roll Turning Lathe, to turn 2 rolls from single or double drive.

1—18" or 20" Roll Turning Lathe, to turn rolls single.

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Capacity 14 Gauge — Full Width

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INDUSTRIAL ENGINEERS
Prefer Steel Mill Experience

Career opportunities are available for supervisory and non-supervisory industrial engineers with training or experience in methods engineering or incentive plans. If your present position does not fully utilize your capacity, we may have the opening you are looking for, with a future potential limited only by your demonstrated performance.

Must be willing to locate in Southern California at the Fontana plant of Kaiser Steel Corporation.

Send complete resume, including education, experience, and salary requirements to Employment Manager

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PANGBORN BLAST CLEANING ROOM

14' x 30'

No. 612 Type "MS" with complete recovery system. "BVR-7" abrasive separator. "AQ-1" hose machine. No. 6118 Type "CH-2" dust collector. All complete with motors and controls. New late 1950. Used on one Government contract. Asking less than half new price. Available immediately.

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Open capacity on 24 ft. and 10 ft. Vertical Boring Mills 7", 5" and 4" Horizontal Boring Mills; large radials and supporting small machines including new 2 AC Warner & Swasey automatic chucking. Especially interested in producing weldments requiring machining.

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MicroRold® 430!

MicroRold Type 430 is a straight chromium-stainless with a nominal composition of 17% chromium. Though it is less resistant to corrosion, it retains all of the other desirable qualities of stainless and has proven very satisfactory in a wide range of mild corrosion applications.

MicroRold 430 is the least expensive of all stainless types because it does not contain nickel. This results in a 7¾c per pound difference in base price between Type 430 and Type 302, the most popular higher grade stainless. A saving of $155 per ton is possible and is of merit to cost-conscious fabricators.

Considering the price advantage, with no sacrifice in quality when applied properly, you will find MicroRold 430 a worthwhile material for your product.

Your steel distributor can help you get the most for your stainless steel dollar. He will gladly tell you the MicroRold Story.

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WASHINGTON, PENNSYLVANIA

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WITH A HANNIFIN AIR PRESS

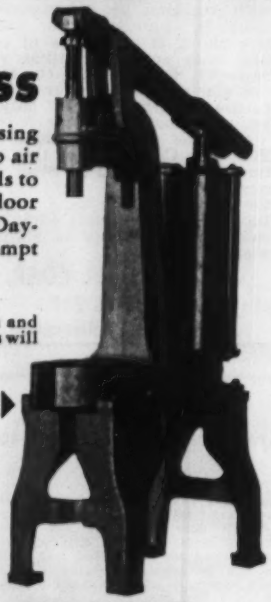
It's the ideal press for that occasional pressing job. These presses operate off ordinary shop air supply. They're fast and safe. Over 30 models to choose from...many for either bench or floor mounting. Capacities from ½ to 18 tons. Daylight to 46 inches...reach to 12 inches. Prompt delivery.

WRITE. Complete information and prices on Hannifin Air Presses will be sent on request.

6 Tons (Model B-2) One of more than 30 models. Press with base, $554.

1-ton Hand-D-Press. For small parts manufacturers. Press, $232.

Prices F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.



HANNIFIN

HANNIFIN CORPORATION, 523 S. WOLF ROAD, DES PLAINES, ILLINOIS

ment and machinery, construction, line pipe and oil and chemical work. Standard Oil (New Jersey) will spend $300 million for refinery expansion next year. DuPont may spend as much as $140 million for expansion in 1956.

Shipwork, which has lagged the last few years, is expected to pick up. The Portland, Me., shipyard will be reactivated to build two Texas tower radar platforms. About 12,000 tons of steel, largely plates, will be required.

Wire . . .

Wire Prices, Pages 134 & 135

Pressure for shipments of industrial wire point to low consumer inventories. Efforts to build up stocks are reported fruitless and more users are inclined to order forward delivery tonnage.

Demand for spring and coil wire in New England is heavy. First quarter mill schedules are well filled. The same is true of rod capacity. Wire strand for prestressed concrete structures is in more active demand.

Tubular Goods . . .

Tubular Goods Prices, Page 136

The only tubular product not booked to capacity through the remainder of this year is standard pipe. This item is sold largely through distributors for construction installations.

Demand reflects seasonal fluctuations in building operations. Currently, building needs are supporting capacity production, but mill order books are filled for only one month ahead.

Demand is solid for other tubular goods well into the first quarter of next year.

Warehouse . . .

Warehouse Prices, Page 137

The steel supply outlook at the warehouse level remains cloudy. Distributors don't know if they will be able to round out stocks of sheet, plate, structurals and bars in the first quarter. Present information makes prospects poor for any loosening of supply. Mills are accepting few orders for January shipment and are slower than usual in announcing how much steel will be available after that month.

Demand from small fabricators is brisk, especially for alloys and specialties, but not so strong as that reported by mills from large consumers. A Chicago distributor's shipments during the second week of November were close to the all-time high, not excluding the war period.

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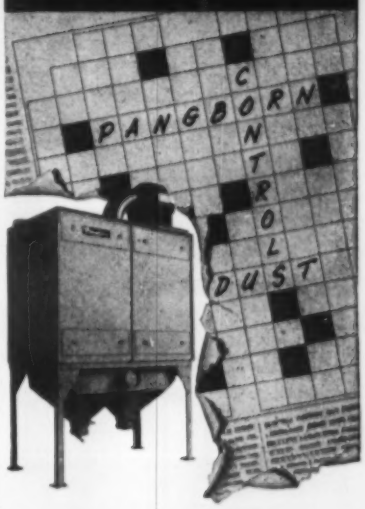


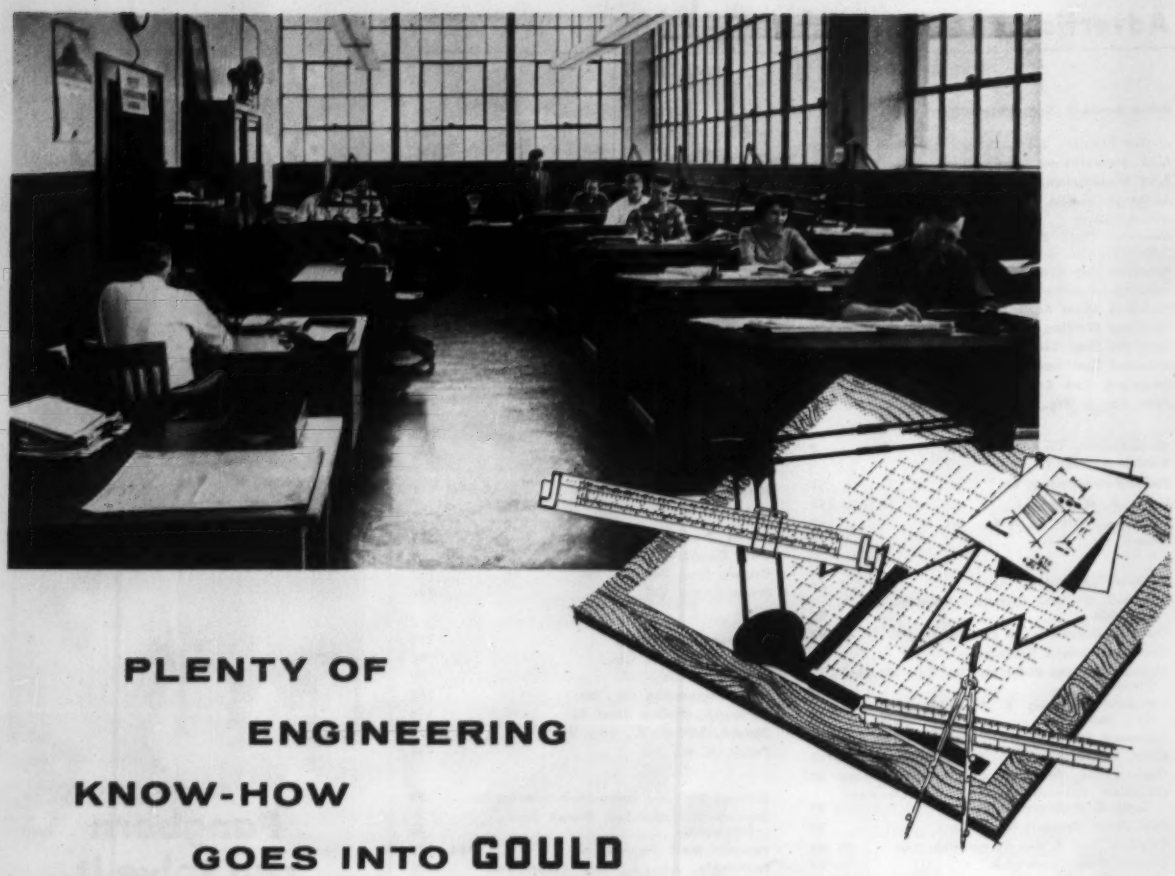
Pangborn can solve it for you!

Pangborn Unit Dust Collectors give thorough, efficient dust control at any individual operation. Requiring little floor space, they can be located anywhere. Use the Pangborn Dust Collector to:

- **Reclaim valuable material**
- **Reduce dust damage to expensive machinery and finished products**
- **Cut plant housekeeping costs**
- **Speed production — improve working conditions**

Investigate Pangborn Unit Dust Collectors now! Shipped assembled ... $545 and up. For details, write to: PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Dust Control and Blast Cleaning Equipment.*

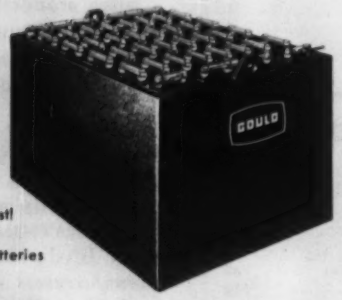
Pangborn
CONTROLS DUST



PLENTY OF ENGINEERING KNOW-HOW GOES INTO GOULD RESEARCH BUILT BATTERIES!

On the drawing boards in the Gould engineering department, theory is made practical. Drawings and specification charts indicate the right plate size, battery case size, the eventual battery capacity, how grids should be cast, how active material should be mixed and how the battery should be constructed—to make sure you get the right battery for the right job!

One more reason why you get better batteries first from Gould!



America's Finest!
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"BETTER BATTERIES THROUGH RESEARCH"

Always Use Gould-National Automobile and Truck Batteries

GOULD Batteries

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can YOUR production equipment KEEP UP WITH THIS MARKET?

★ By 1965, the experts predict there will be 80 million automobiles in existence, as compared to some 50 million now.

For that traffic load, more than 50 billion dollars will be needed to rebuild the 3,350,000 miles of existing roads and to build new super highways.

Each million dollars of highways requires between 420 and 450 tons of steel. Each automobile averages about 3,500 pounds of steel, plus many pounds of copper, brass, aluminum, rubber and plastic.

Will you lose out competitively on this big market on poor quality of product or slow production equipment? Good equipment brings down production costs and improves product quality.

Aetna-Standard designs and builds equipment for producing, processing and fabricating steel, copper, brass, aluminum, rubber and plastic. Here is one example—an 80" Sheet Side Trimming and Shearing Line at the Fairless Works, U. S. Steel Corporation. Other Aetna major product lines include: Pipe Mills (Seamless and Butt Weld); Continuous Coating Lines; Rolls; Drawbenches; Machinery for Rubber and Plastic.

SUBSIDIARY and ASSOCIATED COMPANIES

The Aetna-Standard Engineering of Canada, Ltd., Toronto, Ontario, Canada.
The Head Wrightson Machine Company, Ltd., Middlesbrough, Eng.
Societe de Constructions de Montbard, Montbard, France.
Demag Aktiengesellschaft, Duisburg, Germany.
Compagnia Italiana Forme Acciaio, Milano, Italy.
Aetna-Japan Company, Ltd., Tokyo, Japan.
Engineering and Development Corporation of the Philippines, Manila, P. I.
Hale and Kullgren, Inc., Akron, Ohio.
M. Castellvi, Inc., New York, N. Y.
Standard Engineering Co., Ellwood City, Pa.
Trans-World Traders, Inc., Pittsburgh, Pa.

Designers and Builders to the Steel, Copper, Brass, Aluminum, Rubber, Plastic and Chemical Industries

THE AETNA-STANDARD ENGINEERING COMPANY • PITTSBURGH, PA.

Aetna-Standard

PLANTS IN WARREN, OHIO • ELLWOOD CITY, PENNSYLVANIA

GOOD EQUIPMENT BRINGS DOWN PRODUCTION COSTS

Saves fuel hauling heavy ingots—because TIMKEN® bearings cut starting resistance 88%!

WHEN a locomotive starts pulling a long string of heavy ingot cars it has to overcome tremendous starting resistance. That's why Plymouth Locomotive Works put the axles of its 65-ton locomotive on Timken® tapered roller bearings—they cut starting resistance 88% as compared with friction bearings!

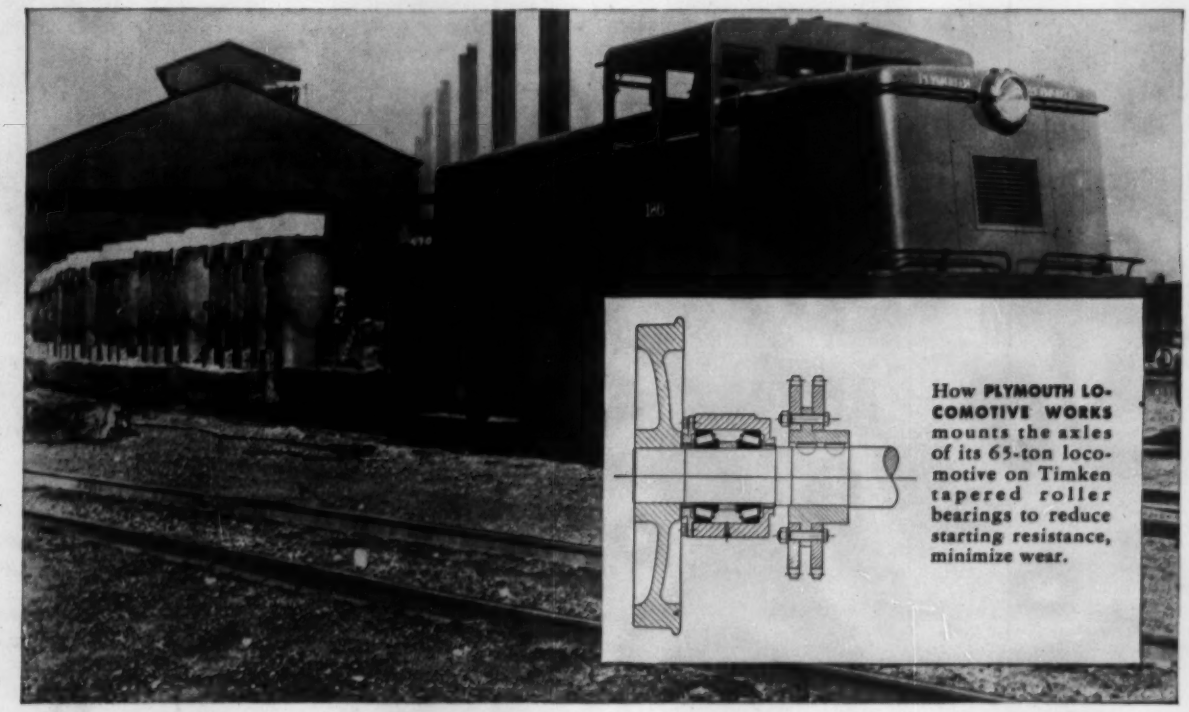
The reduced starting resistance of Timken bearings is made possible because they *roll* the load instead of sliding it. Timken bearings practically eliminate friction. Less starting resistance means important fuel savings, since this locomotive is constantly starting and stopping—chief cause of fuel consumption.

Because Timken bearings are tapered, they take any combination of radial and thrust loads without the need for costly auxiliary thrust bearings. Shock loads are no problem. Timken bearings have tough, shock-resistant cores under hard, wear-resistant surfaces. And you're doubly assured of Timken bearings' quality because we make our own steel. No other bearing maker in this country does.

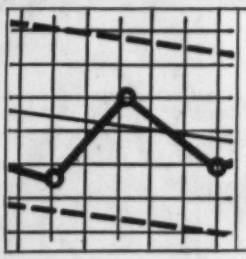
They're designed by geometrical law to have true rolling motion and made with microscopic accuracy to conform to their design.

For longer life, smoother operation and less maintenance, always look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best



How **PLYMOUTH LOCOMOTIVE WORKS** mounts the axles of its 65-ton locomotive on Timken tapered roller bearings to reduce starting resistance, minimize wear.



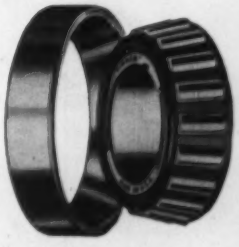
STATISTICAL QUALITY CONTROL

To insure uniform high quality and closer tolerances, the Timken Company uses statistical quality control. With it, tolerance deviations are plotted graphically. It's one of industry's newest, most scientific methods of improving product uniformity.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ⬮ AND THRUST →⬮← LOADS OR ANY COMBINATION